Montana Fish, Wildlife and Parks

1420 E. 6th Ave, P.O. Box 200701 Helena, MT 59620-0701
(406)444-2452

Environmental Assessment Checklist

Part 1. Proposed Action Description

Project Title: Hardy Creek Restoration
Date: 9/12/19
Name, Address and Phone Number:

Jason Mullen
Montana Fish, Wildlife & Parks
4600 Giant Springs Road
Great Falls, Mt. 59405
406-454-5855

Project Location: Hardy Creek, south of Cascade, Montana

Purpose of the project:
Reconnect Hardy Creek with the Missouri River by reconstructing a stream channel through a gravel pit, redefining the channel downstream of the gravel pit, and removing or modifying several culverts in lower Hardy Creek. Restoration of the channel will allow Hardy Creek to function as a spawning and rearing tributary for trout in the Missouri River.

Description of the project:
Hardy Creek is a small tributary (approximately 10.2 sq mi drainage area) to the Missouri River, south of Cascade, MT. Hardy Creek is a 1st order stream and is designated as perennial on the 1961 USGS quad topo map approximately 0.6 miles upstream of the current Old Highway 91. From this point downstream, Hardy Creek is designated as intermittent; however, Hardy Creek flowed year-round underneath the current I-15 during 2017, which was a dry year, and typically flows year-round downstream to the gravel pit.

Hardy Creek has been impacted significantly by construction of a gravel pit on the channel by the early 1960s and the development of numerous road crossings, including in the Pistoria Tracts sub-division, the interstate on and off ramps, and Old Highway 91, all of which are within 0.5 miles from the confluence with the Missouri River. Currently, Hardy Creek flows into a 4.5-acre gravel pit, approximately 0.2 miles upstream from Missouri River (Figure CH-1). The gravel pit outlet elevation is greater than the inlet, thus the gravel pit must fill before it flows out to the Missouri River. Occasionally (when flow and rainbow trout spawning coincide) rainbows will swim up the channel to spawn and then as the water recedes adults and juveniles get trapped in the pond. Typically, the gravel pit and the channel downstream is completely dry by summer, despite perennial flow under the interstate and to the gravel pit. Downstream of the gravel pit,

the Hardy Creek channel goes under a railroad bridge and through a culvert (Figure CH-1), before making its way to the Missouri River. The channel downstream of the gravel pit is poorly defined, due to the encroachment of vegetation into the channel from the dampening of flows from the gravel pit. Upstream of the gravel pit, the culvert at the Old Highway 91 is perched and prevents passage of fish into upper Hardy Creek. The project aims to reconnect Hardy Creek with the Missouri River by reconstructing the stream channel through the gravel pit, redefining the channel downstream of the gravel pit, and removing or modifying several culverts in lower Hardy Creek. Restoration of the channel will allow Hardy Creek to function as a spawning and rearing tributary for trout in the Missouri River, which would provide a significant benefit to the Missouri River fishery. The Missouri River below Holter Dam is consistently one of the most popular fisheries in the state, ranking first in angler use in 2015 with 183,479 angler days.

The project is broken down into five sections, A through E, as shown in Figure 1 in the Supplemental Materials. The five sections are as follows:

A) Use approximately 3,300 cubic yards of fill from south end of the gravel pit to reconstruct the floodplain on the north end of the gravel pit. Construct approximately 360 ft of "C" stream channel on north end of gravel pit through the newly constructed floodplain. See design Figures CH-2, CH-3, and CH-4 for details.
B) Lower stream channel approximately 2.5 to 2.8 ft under railroad and less than 2 ft at the road crossing at Creek Crossing (shown as Pistoria Lane in Map 1 based on former name). This is required in order to maintain stream grade. The stream channel will be centered between the railroad abutments, and the banks will be rip rapped with approximately 20 cubic yards of 2-ft minus rip rap (40 ft of each bank) under the railroad bridge. Rip rap will be keyed 1 ft below the streambed and 1 ft up the bank to the bankfull height. The design has been approved by BNSF railroad. The culvert at Creek Crossing will be removed and replaced with a bridge using bridge stringers provided by Montana Fish, Wildlife and Parks. The upstream and downstream ends of the bridge will be rip rapped using existing rip rap that is present for the culvert. See design Figures CH-2, CH-3, and BNSF Bridge Design Memo for details.
C) Reconstruct stream channel following the existing channel from Creek Crossing downstream to the confluence with the Missouri River. This maintenance of the channel is needed to redefine the channel as it has become overgrown because of the dampening of flows by the gravel pit for decades. No fill or materials will be brought into the mapped floodplain of the Missouri River, materials will only be repurposed within this section. See design Figures CH-2, CH-3, and CH-4 for details.
D) The current culvert at Old Highway 91 (Recreation Road) results in a barrier to fish movement due to it being perched above the stream bottom and the size of the culvert. The project will construct four drop structures to build the stream up to the elevation of the culvert to allow for fish passage. The drop structure at the culvert mouth will be 1.5 feet above the bottom of the culvert to pool up water approximately 60 feet into the 96-ft long culvert. We will construct baffles within the upstream end of the culvert that will be

attached to baffle support beams running the length of the culvert and anchored to the concrete footer at the upstream end of the culvert (See Design Figure CH-5). Boulders will also be placed within the culvert to support the baffles and baffle supports. These measures are necessary to provide fish passage through the culvert. Based on simulations using the program Fish Xing, rainbow trout will not be able to pass through the existing culvert at most flows, without a modification to provide refuge within the culvert (See Fish Xing Simulation Results). Electrofishing showed reduced numbers of rainbow trout upstream of the culvert and observations of large Missouri River rainbow trout congregating in the pool below the culvert (Figure 13) provide additional evidence the culvert is a barrier at most flows.

E) Realign stream channel immediately upstream of an undersized culvert at Tower Rock Road to provide a direct channel through the culvert to improve the passage of flow, bedload, and debris. The stream currently bends immediately upstream of the culvert resulting in excess deposition of material and debris and exacerbating the problem of the undersized culvert. See design Figures CH-1 and CH-2.

The project is described in detail in the attached Joint Application submitted to the permitting agencies.

The proposed stream restoration described herein has been designed by Allen McNeal of McNeal Resources. Allen McNeal is a stream restoration specialist with 26 years of experience in the design and implementation of stream restoration projects. Allen McNeal will provide the construction oversight for all construction related activities.

The project is funded by private entities including, Pat Barnes Trout Unlimited, Missouri River Flyfishers Chapter of Trout Unlimited, Montana Trout Unlimited, Northwestern Energy, and Montana Trout Foundation. As indicated by the funding contributors, this project is supported by two local sporting groups. Montana Department of Transportation (MDT) will provide fill from the south end of the gravel pit and rock from the stockpile created from the rockfall mitigation project. Construction activities will take place on three private landowners, who have pledged support for the project, as well as MDT and MFWP property.

Other groups or agencies contacted or which may have overlapping jurisdiction:

Montana DEQ
Montana DOT
Montana FWP
Cascade County Floodplain
Army Corps of Engineers
BNSF Railway
Pistoria Tracts Homeowners Association
Private landowners

Part 2 Environmental Review

Table 1. Potential impact on physical environment.

Will the proposed action result in potential impacts to:	Unknown	Potentially significant	Minor	None	Can Be mitigated	Comments provided
1. Unique, endangered, fragile, or limited environmental resources				x		
2. Terrestrial or aquatic life and /or habitats		x				2.
3. Introduction of new species into an area				x		
4. Vegetation cover, quantity and quality.		x				4.
5. Water quality, quantity and distribution (surface or groundwater)			x			5.
6. Existing water right or reservation.				x		
7. Geology and soil quality, stability and moisture				x		
8. Air quality or objectionable odors			x			8.
9. Historic and archaeological sites				x		9.
10. Demands on environmental resources of land, water, air and energy				x		
11. Aesthetics			x			11.

Comments

(A description of potentially significant, or unknown, impacts and potential alternatives for mitigation must be provided.)

2. The project is designed to restore a pond to a properly functioning channel and stream habitat. Most of the construction activities will be completed when conditions are dry, or if flowing, at low flows. The project is designed to have a positive impact on fish and other aquatic life by constructing a stream channel through the gravel pit and restoring connectivity to the Missouri River. Upon completion, trout from the Missouri River will be able to use Hardy Creek for spawning. The construction of the stream channel through the gravel pit would also result in expected positive impacts to terrestrial organisms through development of a floodplain and riparian habitat. The only negative impacts expected would be the disturbance during construction and disbursement from the site. These impacts would be short-term and minor.

4. There would be a short-term and minor impact to vegetation from construction equipment. Much of the work will be completed in the gravel pit, where no vegetation currently exists. Much of the vegetation removed during the construction process will be reused to stabilize newly contoured banks. Rooted willow, cottonwood, sedge, and grasses will be translocation on site to stabilize streambanks. Willow sprigs will also be planted. Any disturbed

areas will be reclaimed to prevent erosion and the spread of weeds. Follow up monitoring will be required as a condition of the permitting agencies. This monitoring will ensure that vegetation is reestablished. If weeds become problematic, weed control will be implemented.

5. There may be a short-term and minor increase in turbid water during the construction process. The application listed several measures to reduce water turbidity, including work being completed during dry conditions. If flow exists, work will be completed during low flow conditions and using a silt fence. The project is designed to transport water through the gravel pit. There would be no net loss of water quantity.

8. The project involves using diesel powered equipment which emit exhaust and can be loud. It is unlikely that anyone would be disturbed in any significant level from the exhaust. Impacts from exhaust would be short-term and minor as exhaust fumes would dissipate rapidly and construction activities would be relatively short in duration.

9. A cultural resource survey of the project area was completed in April 2018. The survey concluded the following, "The pedestrian inventory located no cultural resources within the study area. The proposed undertaking will not affect any cultural resources. Nor further cultural resource work is required." The results of the survey were reviewed by the State Historic Preservation Office, which concurred with the results on May 1, 2018.

11. There will be some impact to the aesthetics at this site. During construction the site would have the appearance of a construction site. The project is designed to restore a stream channel through a gravel pit that is frequently dry. There would be a long-term positive impact to aesthetics as a result of the project.

Will the proposed action result in potential impacts to:	Unknown	Potentially significant	Minor	None	Can Be mitigated	Comments provided
1. Social structures and cultural diversity				x		
2. Changes in existing public benefits provided by wildlife populations and/or habitat			x			2.
3. Local and state tax base and tax revenue				x		
4. Agricultural production				x		
5. Human health				x		
6. Quantity and distribution of community and personal income				x		
7. Access to and quality of recreational activities		x				7.
8. Locally adopted environmental plans & goals (ordinances)				x		
9. Distribution and density of population and housing				x		
10. Demands for government services				x		
11. Industrial and/or commercial activity				x		
12. Other – Travel			x			12.

Comments

(A description of potentially significant, or unknown, impacts and potential alternatives for mitigation must be provided as comments.)

2. The project will result in a significant impact to public resources by restoring spawning and rearing habitat in Hardy Creek and reconnecting it to the Missouri River, thereby enhancing the Missouri River trout fishery.

7. The project is specifically designed to enhance habitat that is vital to maintaining the Missouri River trout fishery. This fishery is one of the top three in Montana, in terms of most angler use. The project is expected to result in a positive impact to recreationists.

12. Travel may need to be restricted along the Tower Rock Road to the Pistoria Tracts Subdivision for a short period of time, when work is being completed near the culvert. Care will be taken to minimize the time when travel is restricted and inform the affected landowners prior to that time. Montana Fish, Wildlife and Parks will coordinate with the Pistoria Tracts Subdivision Homeowner's Association and the Montana Department of Transportation prior to construction activities to develop a plan for any activities that impact travel to and from the subdivision.

Does the proposed action involve potential risks or adverse effects which are uncertain but extremely harmful if they were to occur?

There is some risk of experiencing a flood event in the new channel prior to the new vegetation becoming established. The new channel through the gravel pit is designed to allow flood waters to overtop the banks and inundate the entire floodplain with excess water flowing into the remaining gravel pit on the south side of the channel. This risk is being mitigated as much as possible through the design of where flood waters will go (to the southern gravel pit) and through attempts to revegetate the new channel as quickly as possible.

Does the proposed action have impacts that are individually minor, but cumulatively significant or potentially significant?

No. The proposed action is localized and designed to correct a dysfunctional stream channel.

Description and analysis of reasonable alternatives (including the no action alternative) to the proposed action when alternatives are reasonably available and prudent to consider. Include a discussion of how the alternatives would be implemented:

The joint application described the no action alternative. The project objectives would not be met under the no action alternative. The action alternative was developed by professionals with expertise in hydraulic engineering and stream mechanics. This action was determined to be the best approach for restoring the stream channel.

Evaluation and listing of mitigation, stipulation, or other control measures enforceable by the agency or another government agency:

The project is designed to restore the function of the stream channel. Enforceable measures are included in permits from 4 agencies. FWP will issue SPA 124 for the proposed stream bank work. FWP, with authority from DEQ, will also issue 318 Authorization for Short Term Water Quality Standard for Turbidity Related to Construction Activity. Cascade County Floodplain will review regarding floodplain requirements. US Army Corps of Engineers (ACOE) will review and issue a 404 permit as it involves placement of fill into waters of the U.S. It is expected that the amount of wetlands created by the project will equal or exceed the amount lost. If this is not the case, mitigation will be required by the ACOE through the permitting process. Monitoring will be required by the ACOE and a monitoring plan was submitted with the Joint Application. An encroachment permit application and joint application has been submitted to MDT for work within the road right of way.

An application has also been submitted to BNSF railroad to complete work within the BNSF right of way. This application has been reviewed and accepted by BNSF. The final permit will be acquired prior to implementation.

Recommendation concerning preparation of EIS and public comment:
Due to the limited scope and anticipated impacts from the proposed project, an Environmental Assessment is appropriate for the project.

This project occurs on private property, Montana Department of Transportation property, and Montana Fish, Wildlife and Parks property. All landowners have agreed to the project and will have the opportunity to review the final design. Landowner access agreements will be signed prior to implementing the project. Due to part of the project being completed on public land, and the potential short-term impact to homeowners in the area based on travel limitations, a formal comment period for this EA is necessary.

This EA and attached Joint Application will be posted on the MFWP internet site (http://fwp.mt.gov/news/publicNotices/) and mailed directly to interested persons. Any interested citizen is encouraged to contact MFWP and the preparer of this EA to discuss the proposal or to provide comments.

Duration of the comment period:

The comment period is 30 days. Public comment will be accepted through **October 14, 2019 at 5:00 PM**.

Upon completion of the comment period all comments will be reviewed, and a decision notice will be issued by the MFWP Region 4, Regional Supervisor.

Name, title, address, and telephone number of the Person Responsible for Preparing the EA.

Jason Mullen
Fisheries Biologist
Montana Fish, Wildlife and Parks
4600 Giant Springs Road
Great Falls, MT 59405
(406) 454-5855
jmullen@mt.gov

Date Prepared: September 12, 2019

Submit written comments to:

Montana Fish, Wildlife & Parks
R-4 Fisheries
Hardy Creek EA Comments
4600 Giant Springs Rd
Great Falls, MT 59405

Revised: 6/5/15 (310 form 270). Form may be downloaded from: www.dnrc.mt.gov/licenses-and-permits/stream-permitting	**AGENCY USE ONLY:** Application # _____ Date Received _____ Date Accepted _____ / Initials ____ Date Forwarded to DFWP _____

This space is for all Department of Transportation and SPA 124 permits (government projects).
Project Name _____
Control Number _____ Contract letting date _____
MEPA/NEPA Compliance ☐ Yes ☐ No If yes, #14 of this application does not apply.

JOINT APPLICATION FOR PROPOSED WORK IN MONTANA'S STREAMS, WETLANDS, FLOODPLAINS, AND OTHER WATER BODIES

Use this form to apply for one or all local, state, or federal permits listed below. The applicant is the responsible party for the project and the point of contact unless otherwise designated. **"Information for Applicant"** includes agency contacts and instructions for completing this application. To **avoid delays**, submit all required information, including a **project site map and drawings.** Incomplete applications will result in the delay of the application process. **Other laws may apply**.

The applicant is responsible for obtaining all necessary permits and landowner permission before beginning work.

✓	PERMIT	AGENCY	FEE
	310 Permit	Local Conservation District	No fee
X	SPA 124 Permit	Department of Fish, Wildlife and Parks	No fee
X	Floodplain Permit	Local Floodplain Administrator	Varies by city/county ($25 - $500+)
X	Section 404 Permit, Section 10 Permit	U. S. Army Corps of Engineers	Varies ($0 - $100)
X	318 Authorization 401 Certification	Department of Environmental Quality	$250 (318); $400 - $20,000 (401)
	Navigable Rivers Land Use License, Lease, or Easement	Department of Natural Resources and Conservation, Trust Lands Management Division	$50, plus additional fee

A. APPLICANT INFORMATION

NAME OF **APPLICANT** (person responsible for project): Montana Fish, Wildlife & Parks - Jason Mullen
Has the landowner consented to this project? ☒ Yes ☐ No
Mailing Address: 4600 Giant Springs Road, Great Falls, MT 59405
Physical Address: 4600 Giant Springs Road, Great Falls, MT 59405
Day Phone: 406-454-5855 Evening Phone: N/A E-Mail: jmullen@mt.gov

NAME OF **LANDOWNER** (if different from applicant): Stan Peck, Montana Dept. of Transportation, Elaine Olsen, and Peter Grundy
Mailing Address: Multiple – See Part D. #3
Physical Address: Tower Rock Road, Cascade, MT 59421
Day Phone: Multiple – See Part D. #3 Evening Phone: N/A E-Mail: Multiple – See Part D. #3

NAME OF **CONTRACTOR/AGENT**): Allen McNeal
Mailing Address: 101 Lower Gurnett Creek Road, Townsend, MT 59644
Physical Address: 101 Lower Gurnett Creek Road, Townsend, MT 59644
Day Phone: 406-465-4604 Evening Phone: N/A E-Mail: mcnealres@mt.net

B. PROJECT SITE INFORMATION

NAME OF **STREAM** or **WATER BODY** at project location Hardy Creek Nearest Town Cascade, MT
Address/Location: Tower Rock Road, Cascade, MT 59421 Geocode (if available): N/A
Choose.1/4 Choose. 1/4 Choose. 1/4, Section 25, 36, Township 17N, Range 2WCounty Cascade
Longitude-111.80499, Latitude 47.18821

The state owns the beds of certain state navigable waterways. Is this a state navigable waterway? No. If yes, send copy of this application to appropriate DNRC land office – see Information for Applicant.

ATTACH A PROJECT SITE MAP OR A SKETCH that includes: 1) the water body where the project will take place, roads, tributaries, landmarks; 2) a circled "X" representing the exact project location. IF NOT CLEARLY STATED ON THE MAP OR SKETCH, **PROVIDE WRITTEN DIRECTIONS TO THE SITE.**

C. PROJECT INFORMATION

1. **TYPE OF PROJECT** (check all that apply)

☒ Bridge/Culvert/Ford Construction	☒ Fish Habitat	☐ Mining
☒ Bridge/Culvert/Ford Removal	☐ Recreation (docks, marinas, etc.)	☐ Dredging
☐ Road Construction/Maintenance	☐ New Residential Structure	☐ Core Drill
☒ Bank Stabilization/Alteration	☐ Manufactured Home	☒ Placement of Fill
☐ Flood Protection	☐ Improvement to Existing Structure	☐ Diversion Dam
☒ Channel Alteration	☐ Commercial Structure	☐ Utilities
☐ Irrigation Structure	☐ Wetland Alteration	☐ Pond
☐ Water Well/Cistern	☐ Temporary Construction Access	☐ Debris Removal
☐ Excavation/Pit	☒ Other _Habitat Restoration – Channel reconstruction through old gravel pit – Replace culvert with Bridge – Fish passage through culvert currently acting as barrier to movement	

2. **PLAN OR DRAWING** of the proposed project **MUST** be attached. **This plan or drawing must include**:

- a plan view (looking at the project from above)
- dimensions of the project (height, width, depth in feet)
- location of storage or stockpile materials
- drainage facilities
- an arrow indicating north
- a cross section or profile view
- an elevation view
- dimensions and location of fill or excavation sites
- location of existing or proposed structures, such as buildings, utilities, roads, or bridges

See Figures CH-1 through CH-5

3. **IS THIS APPLICATION FOR** an annual maintenance permit? ☐ Yes ☒ No
(If yes, an annual plan of operation must be attached to this application – see "Information for Applicant")

4. **PROPOSED CONSTRUCTION DATE**. Include a project timeline. Start date 10/1/2019
Finish date 12/31/2021 Is any portion of the work already completed? ☐ Yes ☒ No
(If yes, describe the completed work.)

Final construction schedule will be contingent on the water year and when the gravel pit goes dry. Some work may be able to be completed in phases.

5. **WHAT IS THE PURPOSE** of the proposed project?
Reconnect Hardy Creek with the Missouri River by reconstructing a stream channel through the gravel pit, redefining the channel downstream of the gravel pit, and removing/modifying several culverts in lower Hardy Creek. Restoration of the channel will allow Hardy Creek to function as a spawning and rearing tributary for trout in the Missouri River.

6. **PROVIDE A BRIEF DESCRIPTION** of the proposed project.
Hardy Creek is a small tributary (approximately 10.2 sq mi drainage area) to the Missouri River, south of Cascade, MT. Hardy Creek is a 1st order stream and is designated as perennial on the 1961 USGS quad topo map approximately 0.6 miles upstream of the current Old Highway 91. From this point downstream, Hardy Creek is designated as intermittent; however, Hardy Creek flowed year-round underneath the current I-15 during 2017, which was a dry year, and typically flows year-round downstream to the gravel pit.

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Missouri River (Figure CH-1). The gravel pit outlet elevation is greater than the inlet, thus the gravel pit must fill before it flows out to the Missouri River. Occasionally (when flow and rainbow trout spawning coincide) rainbows will swim up the channel to spawn and then as the water recedes adults and juveniles get trapped in the pond. Typically, the gravel pit and the channel downstream is completely dry by summer, despite perennial flow under the interstate and to the gravel pit. Downstream of the gravel pit, the Hardy Creek channel goes under a railroad bridge and through a culvert (Figure CH-1), before making its way to the Missouri River. The channel downstream of the gravel pit is poorly defined, due to the encroachment of vegetation into the channel from the dampening of flows from the gravel pit. Upstream of the gravel pit, the culvert at the Old Highway 91 is perched and prevents passage of fish into upper Hardy Creek. The project aims to reconnect Hardy Creek with the Missouri River by reconstructing the stream channel through the gravel pit, redefining the channel downstream of the gravel pit, and removing or modifying several culverts in lower Hardy Creek. Restoration of the channel will allow Hardy Creek to function as a spawning and rearing tributary for trout in the Missouri River, which would provide a significant benefit to the Missouri River fishery. The Missouri River below Holter Dam is consistently one of the most popular fisheries in the state, ranking first in angler use in 2015 with 183,479 angler days.

The project is broken down into five sections, A though E, as shown in Figure 1 in the Supplemental Materials. The five sections are as follows;

A) Use approximately 3,300 cubic yards of fill from south end of the gravel pit to reconstruct the floodplain on the north end of the gravel pit. Construct approximately 360 ft of "C" stream channel on north end of gravel pit through the newly constructed floodplain. See design Figures CH-2, CH-3, and CH-4 for details.

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D) The current culvert at Old Highway 91 (Recreation Road) results in a barrier to fish movement due to it being perched above the stream bottom and the size of the culvert. The project will construct four drop structures to build the stream up to the elevation of the culvert to allow for fish passage. The drop structure at the culvert mouth will be 1.5 feet above the bottom of the culvert to pool up water approximately 60 feet into the 96-ft long culvert. We will construct baffles within the upstream end of the culvert that will be attached to baffle support beams running the length of the culvert and anchored to the concrete footer at the upstream end of the culvert (See Design Figure CH-5). Boulders will also be placed within the culvert to support the baffles and baffle supports. These measures are necessary to provide fish passage through the culvert. Based on simulations using the program Fish Xing, rainbow trout will not be able to pass through the culvert at most flows, without a modification to provide refuge within the culvert (See Fish Xing Simulation Results). Electrofishing showed reduced numbers of rainbow trout upstream of the culvert and observations of large Missouri River rainbow trout

congregating in the pool below the culvert (Figure 13) provide additional evidence the culvert is a barrier at most flows.

E) Realign stream channel immediately upstream of an undersized culvert at Tower Rock Road to provide a direct channel through the culvert to improve the passage of flow, bedload, and debris. The stream currently bends immediately upstream of the culvert resulting in excess deposition of material and debris and exacerbating the problem of the undersized culvert. See design Figures CH-1 and CH-2.

The proposed stream restoration described herein has been designed by Allen McNeal of McNeal Resources. Allen McNeal is a stream restoration specialist with 26 years of experience in the design and implementation of stream restoration projects. Allen McNeal will provide the construction oversight for all construction related activities.

7. **WHAT IS THE CURRENT CONDITION** of the proposed project site? Describe the existing bank condition, bank slope, height, nearby structures, and wetlands.

Section A. – Gravel pit –

Currently consists of gravel pit devoid of vegetation. Generally the gravel pit fills with water in the spring before going completely dry in summer, despite perennial flow upstream. Summer or fall rain events can result in the filling of the gravel pit, but Hardy Creek generally does not flow downstream of the gravel pit other than during spring flow. Outlet of the gravel pit is at a greater elevation than the inlet of the gravel pit. A 1 foot wetland fringe exists around the edge of the gravel pit and an additional wetland area exists where Hardy Creek enters the gravel pit (See Wetlands Report).

Section B. – Gravel pit outlet to culvert at Creek Crossing –

This section of Hardy Creek is generally dry with the exception of during spring flow or other high flow events. The stream channel is well defined, with an average width of 10 ft, and moderately sloped banks with an average height of approximately 0.8 ft. Streambanks consist of a combination of rock, and typical riparian vegetation (e.g., willow, cottonwood, grass). The streambed elevation at the outlet of the gravel pit is artificially high from sediment deposition and greater than the inlet of the gravel pit. The stream channel is confined in this reach by two railroad bridge abutments and a 10.5-ft wide culvert.

Section C. – Culvert outlet to Missouri River Confluence –

This section of Hardy Creek is generally dry with the exception of during spring flow or other high flow events. This section of Hardy Creek is poorly defined due to the dampening of flows from the gravel pit. Large cottonwoods in the active stream channel are common. The stream channel becomes less defined closer to the Missouri River, with only a very narrow channel detectable with a large amount of willows present. Stream banks are heavily vegetated with willows, cottonwoods, and grass. Stream widths and banks heights vary substantially from the outlet of the culvert downstream to the Missouri River confluence.

Section D. – Frontage road (Old Highway 91) Culvert –

This section consists of an approximate 3.5 ft drop from the outlet of the frontage road culvert to the elevation of the streambed, resulting in a fish passage barrier. The Old Highway 91 culvert is 15 ft wide, 10 ft tall, and 96 ft long. The streambanks immediately downstream of the culvert are heavily rip rapped with large rock. Further downstream the streambanks are vegetated with a combination of willows, cottonwoods, grass, and other shrubs. Natural rock is also common in the streambanks. The stream is approximately 12 ft wide with moderately sloped banks with an average height of approximately 0.6 ft.

Section E. – Tower Rock Road Culvert –

This section consists of a 6ft wide culvert at Tower Rock Road. This culvert is undersized, as shown by the accumulation of debris (currently and from historical accounts) and the large scour hole on the downstream end. Rip rap is present on the upstream and downstream face of the culvert. Streambanks are well vegetated with grass and willows. Stream width and bank heights are approximately 8 ft and 0.8 ft, respectively. The stream curves immediately upstream of the culvert, resulting in scour and debris accumulation along the bank and in front of the culvert.

8. **PROJECT DIMENSIONS**. How many linear feet of bank will be impacted? How far will the proposed project encroach into and extend away from the water body?

Segment A. – Gravel Pit – No stream channel currently exists through the gravel pit. The project will result in transporting approximately 3,300 cubic yards of fill from the south end of the gravel pit to the north end of the gravel pit to construct the floodplain. Approximately 360 ft of a "C" stream channel will be constructed through the newly constructed flood plain in the former north end of the gravel pit. Approximately 90 cubic yards or rock will be used to rip-rap the southern toe of the newly constructed floodplain (i.e., the new north bank of the gravel pit). Several live cottonwood trees will be incorporated into rip rap to promote cottonwood growth. Trees will be taken from upstream of Tower Rock Road on MDT property. See Figures CH-1 through CH-4.

Segment B – Gravel pit outlet to culvert at Creek Crossing – This segment consists of approximately 136 ft of stream channel. The stream channel will be rebuilt to match the appropriate grades. This includes lowering the streambed elevation approximately 2.5 to 2.8 ft (along the thalweg) under the railroad and less than 2 ft at the culvert. The stream channel will be centered between the railroad abutments and the banks will be rip rapped with approximately 20 cubic yards of 2-ft minus rip rap (40 ft of each bank) under the railroad bridge. Rip rap will be keyed 1 ft below the streambed and 1 ft up the bank to the bankfull height. The stream channel will be centered between the two railroad bridge abutments and approximately 40 ft of each bank will be rip rapped (20 cubic yards of rock) under the railroad to protect the abutments (2 ft deep x 3 ft wide x 40 ft long). The culvert will be removed and replaced with a bridge utilizing bridge stringers provided by Montana Fish, Wildlife and Parks. The upstream and downstream ends of the bridge will be rip rapped using existing rip rap that is present for the culvert. See Figures CH-1 through CH-4.

Segment C – Culvert outlet to Missouri River Confluence – This segment consists of approximately 400 ft of stream channel. Maintenance of the stream channel will be conducted to redefine the channel to better pass the flow with the removal of the ponding effect from the gravel pit. The stream channel is currently poorly defined due to the lack of consistent flows and flushing flows, because of the on-stream gravel pit just upstream. Some areas of this section are relatively well defined and will require little maintenance while others will require more maintenance. Existing streambanks and vegetation will be left undisturbed as much as possible. If vegetation is disturbed it will be salvaged in reconstructing the streambanks. See Figures CH-1 through CH-4.

Hardy Creek does not have a mapped floodplain. The floodplain of the Missouri River extends upstream on Hardy Creek within this section to approximately adjacent to the house on the north bank. No fill or materials will be brought into the mapped floodplain of the Missouri River, materials will only be repurposed within this section. For example, the Hardy Creek channel is almost entirely overgrown at the confluence with the Missouri River by grass and willows. The channel will be redefined in this area by removing fill (sediment, grass sods, and willows) from the floodway of the Missouri River to provide a Hardy Creek channel with proper dimensions (Figures CH-2, CH-3, and CH-4). The fill that was removed would then be reused to redefine the channel and construct stream banks to the appropriate dimensions further upstream in Hardy Creek, where is over-widened and undefined, within the flood fringe of the Missouri. No new materials will be brought into the mapped floodplain of the Missouri River during the maintenance of this section to return it to a functioning pre-gravel pit state. Fill will only be removed from the floodway and place further upstream in Hardy Creek in the flood fringe of the Missouri River. All work will be completed in such a manner to provide a naturally functioning Hardy Creek stream channel with the proper dimensions. The landowner on the north bank is aware of and supports the project.

This segment of stream is a relatively high gradient "B" channel. A rock and/or log grade control structure will be constructed between the culvert outlet and the floodway to prevent upstream migration of any headcuts into the restoration reach.

Segment D – Frontage road (Old Highway 91) Culvert – The work in this section consists of constructing 4 rock cross vanes to build the stream back up to the culvert to allow for fish passage through the culvert. Each rock vane will utilize approximately 9 cubic yards of rock. Approximately 50 ft of channel will be impacted. Existing streambanks and vegetation will be left undisturbed as much as possible. If vegetation is disturbed it will be salvaged in reconstructing the streambanks as much as possible. We propose constructing baffles within the upstream end of the culvert that will be attached to baffle support beams running the length of the culvert

and anchored to the concrete footer at the upstream end of the culvert (See Design Figure CH-5). Boulders will also be placed within the culvert to support the baffles and baffle supports. This work is contingent upon approval by MDT, as proposed in a right of way application.

Segment E – Tower Rock Road Culvert – The work in this section consists of realigning the stream channel upstream of the culvert to allow for a straight shot through the culvert. This consists of approximately 100 ft of stream that will be impacted. Streambanks upstream of the culvert will be disturbed in realigning the channel. The realignment will better allow water, sediment and debris to pass through the undersized culvert. The existing vegetation will be reused to reconstruct the channel and streambanks. See Figures CH-1 through CH-4.

For all areas, existing streambanks and vegetation will be left undisturbed as much as possible. All disturbed areas will be revegetated through the use of existing vegetation and/or the planting of native plants (willows, shrubs, grass).

9. **VEGETATION.** Describe the vegetation present on site. How much vegetation will be disturbed or covered with fill material during project installation? (Agencies require that only vegetation necessary to do the work be removed.) Describe the revegetation plan for all disturbed areas of the project site in detail.
Segment A. – Gravel Pit – Gravel pit is largely devoid of vegetation. A small amount of wetlands may be covered with fill at the upstream end of the gravel pit. It is expected the amount of wetlands created will be greater than or equal to the amount lost. See wetlands delineation report. The revegetation plan for the reconstructed stream channel and flood plain consists of salvaging any sods and plants that would be covered by the fill to construct the banks, using rooted willow clumps from nearby sources on the Missouri River, sprigging willow sticks, and spreading a native grass seed mix. Outside bends would utilize a combination of tree revetments and root wads with the above vegetation to construct stable banks (See Figure CH-4).
Segment B – Gravel pit outlet to culvert at Creek Crossing – Streambanks consist of a combination of rock, and typical riparian vegetation (e.g., willow, cottonwood, grass). Riparian vegetation will be disturbed immediately under the railroad where the stream channel will be centered between the bridge abutments and the banks will be rip rapped to protect the abutments. The riparian vegetation that is disturbed will be reused in constructing stream banks in other parts of the project area.
Segment C – Culvert outlet to Missouri River Confluence – Where streambanks are defined they are heavily vegetated with willows, cottonwoods, and grass. This section also has areas where the stream channel is poorly defined due to the dampening of flows from the gravel pit and the encroachment of vegetation into the active stream channel. These area consist largely of willow across a broad floodplain and cottonwoods in the active channel. Some vegetation will be disturbed in redefining the stream channel. The channel will be redefined to prevent disturbance of the existing streambanks and vegetation as much as possible. Any disturbed vegetation will be salvaged in reconstructing the channel. The floodplain of the Missouri River extends upstream on Hardy Creek within this section to approximately adjacent to the house on the north bank. No fill or materials will be brought into the mapped floodplain of the Missouri River, materials will only be repurposed within this section. The Hardy Creek channel is almost entirely over grown at the confluence with the Missouri River by grass and willows. The channel will be redefined in this area, and the fill (sediment, grass sods, and willows) that is removed will be reused to redefine the channel and construct stream banks to the appropriate dimensions in the floodplain further upstream where Hardy Creek is over-widened and undefined. No new materials will be brought into the mapped floodplain of the Missouri River during the maintenance of this section to return it to a functioning pre-gravel pit state.
Segment D – Frontage road (Old Highway 91) Culvert – Most vegetation will be left undisturbed. Some disturbance may occur in getting machinery to the stream. All attempts will be made to minimize disturbance to the existing vegetation. Any disturbed areas will be reclaimed with a native seed mix.
Segment E – Tower Rock Road Culvert – Realigning the streambank upstream of the culvert will result in disturbance of the vegetation, which consists largely of willows and grasses. The disturbed vegetation in the form of willow clumps and sod mats will be reused in reconstructing the newly aligned channel.

For all areas existing streambanks and vegetation will be left undisturbed as much as possible. All disturbed areas will be revegetated through the use of existing vegetation and/or the planting of native plants (willows, shrubs, grass).

10. **MATERIALS**. Describe the materials proposed to be used. Note: This may be modified during the permitting process It is recommended you do not purchase material until all permits are issued.

Cubic yards/Linear feet Size and Type Source

All materials at or below ordinary high water mark.

Segment A. – Gravel Pit –

Fill – 3,300 cubic yards (from south end of gravel pit)

Rock (rip-rap) – (Class 2 – 2-ft minus diameter) 90 cubic yards along southern toe of floodplain (new north bank of gravel pit) All rock will be provided by MDT from the rock pile on site salvaged during Interstate 15 rock fall mitigation operations. 10 cubic yards of Class 3 (2-3 ft diameter) rock for ballast on tree revetments.

Gravel – Source: Montana Fish, Wildlife and Parks @ Pelican Point

Trees – Salvaged onsite or donated from nearby landowners in the Missouri River drainage.

Grass – Sod transplants and native grass seed.

Willow – Salvaged on site or from nearby source on the Missouri River.

Segment B – Gravel pit outlet to culvert at Creek Crossing –

Rock (rip rap) – (Class 1 – 1ft minus diameter) 20 cubic yards – Same source

Segment C – Culvert outlet to Missouri River Confluence –

Upstream of Missouri River Floodplain

Rock – (Class 2-3 ft medium diameter) – 21 cubic yards for three rock drop structures.

Within the Missouri River Floodplain

No new materials. Will only repurpose materials.

Segment D – Frontage road (Old Highway 91) Culvert –

Rock (for rock vanes) – (2- 4 ft medium diameter) Same source

Segment E – Tower Rock Road Culvert –

Willows/Grass – the existing vegetation will be used in reconstructing the newly aligned stream channel.

11. **EQUIPMENT**. List all equipment that will be used for construction of the project. How will the equipment be used on the bank and/or in the water? Note: Make sure equipment is clean and free of weeds, weed seeds, and excess grease before using it in the water waterway. To prevent the spread of aquatic invasive species, to the extent practical, remove mud and aquatic plants from heavy machinery and other equipment before moving between waters and work sites, especially in waters known to be infested with aquatic invasive species. Drain water from machinery and let dry before moving to another location.

All equipment will be inspected prior to use and before leaving the site to ensure it is non-leaking, clean, and free of weeds and excess grease to prevent the spread of aquatic invasive species and noxious weeds. Machinery will be drained of water and dried before moving to another location.

Track dump trucks
Track Excavators
10-wheel dump trucks
Track skidsteer

12. **DESCRIBE PLANNED EFFORTS TO MINIMIZE PROJECT IMPACTS**. Consider the impacts of the proposed project, even if temporary. What efforts will be taken to:

- Minimize erosion, sedimentation, or turbidity?

All work will be completed during low flows or when the streambed is dry. The construction of the flood plain in the gravel pit will completed when the gravel pit is dry. It is anticipated that the remaining work in the gravel

pit of constructing the stream channel, and all the work downstream to the Missouri River will be completed when conditions are dry, which would prevent the mobilization of sediment. If flow exists, best management practices will be employed to prevent mobilization of sediment downstream to the Missouri River, including construction of a silt fence.

- Minimize stream channel alterations?

This project aims to restore the natural function of Hardy Creek. As such, only the necessary stream channel alterations will be completed, as described in this application.

- Minimize effects to stream flow or water quality caused by materials used or removal of ground cover?

All attempts will be made to minimize disturbance to vegetation as much as possible. Any disturbed areas will be reclaimed utilizing the existing vegetation (if possible) and/or the planting of native plants.

- Minimize effects on fish and aquatic habitat?

Most work will be completed during summer or fall when Hardy Creek has gone dry from the gravel pit downstream to the Missouri River, resulting in no fish present. All work will be completed during low flows (or dry) to prevent the mobilization of sediment and destruction of habitat. All work being proposed is to improve the aquatic function of Hardy Creek and improve fish and aquatic habitat. Any disturbed areas will be reclaimed to prevent the loss of fish and aquatic habitat.

- Minimize risks of flooding or erosion problems upstream and downstream?

Work will be completed during low flow or no flow. Replacing the downstream culvert with a bridge and realigning the channel upstream of the 6-ft culvert will reduce the risks associated with flooding and erosion. Any disturbed or reconstructed channels will be revegetated to prevent erosion. No fill will be added within the Missouri River floodplain. Within the Missouri River floodplain, materials will only be repurposed from one area to another. Infrastructure will be rip rapped when appropriate (e.g., railroad bridge pilings and bridge).

- Minimize vegetation disturbance, protect existing vegetation, and control weeds?

For all areas, existing streambanks and vegetation will be left undisturbed as much as possible. All disturbed areas will be revegetated through the use of existing vegetation and/or the planting of native plants (willows, shrubs, grass). Vegetation will be reclaimed as quickly as possible to prevent the spread of weeds. All equipment will be inspected for weeds, and any weeds found removed, prior to getting on-site.

13. **WHAT ARE THE NATURAL RESOURCE BENEFITS** of the proposed project?

This project would restore the natural function of Hardy Creek by reconstructing the stream channel through the gravel pit, redefining the channel downstream of the gravel pit, and removing or modifying several culverts in lower Hardy Creek. Restoration of the channel will allow Hardy Creek to function as a spawning and rearing tributary for the Missouri River, which would provide a significant benefit to the Missouri River fishery.

14. **LIST ALTERNATIVES** to the proposed project. Why was the proposed alternative selected?

Alternative 1 – As proposed
Alternative 2 – No action

If no action were selected, Hardy Creek would continue to flow into the gravel pit and only infrequently make it to the Missouri River. Rainbow trout that enter Hardy Creek during spring high flows would continue to get trapped in the gravel pit and be lost to predation or to the elements as the gravel pit dries up through the summer. Rainbow trout would continue to not be able to pass through the Old Highway 91 culvert, and not be able to access suitable spawning habitat in the upper drainage. The proposed alternative was selected because it would restore the function of Hardy Creek and reconnect it with the Missouri River, providing a benefit to Hardy Creek and the Missouri River. The proposed action was developed as a cost-effective solution to meet the project goals compared to alternative cost-prohibitive scenarios developed in the past.

D. ADDITIONAL INFORMATION FOR SECTION 404, SECTION 10, AND FLOODPLAIN PERMITS ONLY.

If applying for a Section 404 or Section 10 permit, fill out questions 1-3. If applying for a floodplain permit, fill out questions 3-6. (Additional information is required for floodplain permits – See "Information for Applicant.")

1. Will the project involve placement of dredged (excavated) and/or fill material below the ordinary high water mark, in a wetland, or other waters of the US? If yes, what is the surface area to be filled? How many cubic yards of fill material will be used? Note: Wetland delineations are required if wetlands are affected.

The project involves repurposing fill from the south end of the gravel pit and placing in the north end of the gravel pit. The amount of fill to be used on the north end is approximately 3,300 cubic yards over approximately 0.9 acres. A wetland delineation was completed in summer 2018. See wetlands delineation report.

Hardy Creek does not have a mapped floodplain. The floodplain of the Missouri River extends upstream on Hardy Creek within this section to approximately adjacent to the house on the north bank. Some maintenance of the Hardy Creek channel will occur within the mapped floodplain of the Missouri River, but no fill or materials will be brought into the mapped floodplain, they will only be repurposed within this section. For example, the Hardy Creek channel is almost entirely over grown at the confluence with the Missouri River by grass and willows. The channel will be redefined in this area by removing fill (sediment, grass sods, and willows) from the floodway, and using this fill to redefine the channel and construct stream banks to the appropriate dimensions in the floodplain further upstream where Hardy Creek is over-widened and undefined (flood fringe of the Missouri River. No new materials will be brought into the mapped floodplain of the Missouri River during the maintenance of this section to return it to a functioning pre-gravel pit state and no fill will be added to the floodway. The landowners on the north and south banks are aware of and support the project.

Allen McNeal is the stream restoration specialist responsible for design of the project. The project was designed to be in compliance with Cascade County floodplain regulations and will not result in any changes to the floodplain elevation, as no new materials are being brought into the floodplain or floodway. Fill will only be removed from the floodway, and reused in the flood fringe to construct and define the stream banks of Hardy Creek. The project has been completed with assistance by a professional engineer (Hydrometrics – Figures CH-1 through CH-5).

2. Description of avoidance, mitigation, and compensation (see Information for Applicant). Attach additional sheets if necessary.

It is anticipated that no mitigation or compensation will be required because the project will restore the function of Hardy Creek to its natural state and the amount of wetlands created will be greater than or equal to those lost.

3. List the names and address of landowners adjacent to the project site. This includes properties adjacent to and across from the project site. (Some floodplain communities require certified adjoining landowner lists).

All landowners (below) within or adjacent to the project are aware of and support the project.

Montana Department of Transportation
Paul Sturm
Great Falls District Biologist
Montana Department of Transportation
2701 Prospect Helena, MT 59601
406-444-9438

Stan Peck
PO Box 406
Cascade, MT 59421

Elain Olsen
17 Creek Crossing
Cascade, MT 59421
468-9119
461-8393 (cell)

Peter Grundy
2 Kings Row
Cumberland, RI 02864
401-474-1610

4. List all applicable local, state, and federal permits and indicate whether they were issued, waived, denied, or pending. Note: All required local, state, and federal permits, or proof of waiver must be issued prior to the issuance of a floodplain permit.

SPA 124 – Montana Fish, Wildlife and Parks
318 Authorization – Montana Fish, Wildlife and Parks by agreement with Montana DEQ
NWP 27 – US Army Corps of Engineers
Montana Department of Transportation Right of Way Permit - Sections A, D, and E
BNSF Railroad – for work under railroad with BNSF Right of Way – Approved
Cascade County Floodplain

5. Floodplain Map Number 30013C1110E

6. Does this project comply with local planning or zoning regulations? ☒ Yes ☒ No

E. SIGNATURES/AUTHORIZATIONS -- Each agency must have original signatures signed in blue ink.

After completing the form, make the required number of copies and **then sign each copy.** Send the copies with original signatures and additional information required directly to each applicable agency.

The statements contained in this application are true and correct. The applicant possess' the authority to undertake the work described herein or is acting as the duly authorized agent of the landowner. The applicant understands that the granting of a permit does not include landowner permission to access land or construct a project. Inspections of the project site after notice by inspection authorities are hereby authorized.

APPLICANT (Person responsible for project):
Print Name: Jason Mullen

Signature of Applicant 9/12/19 Date

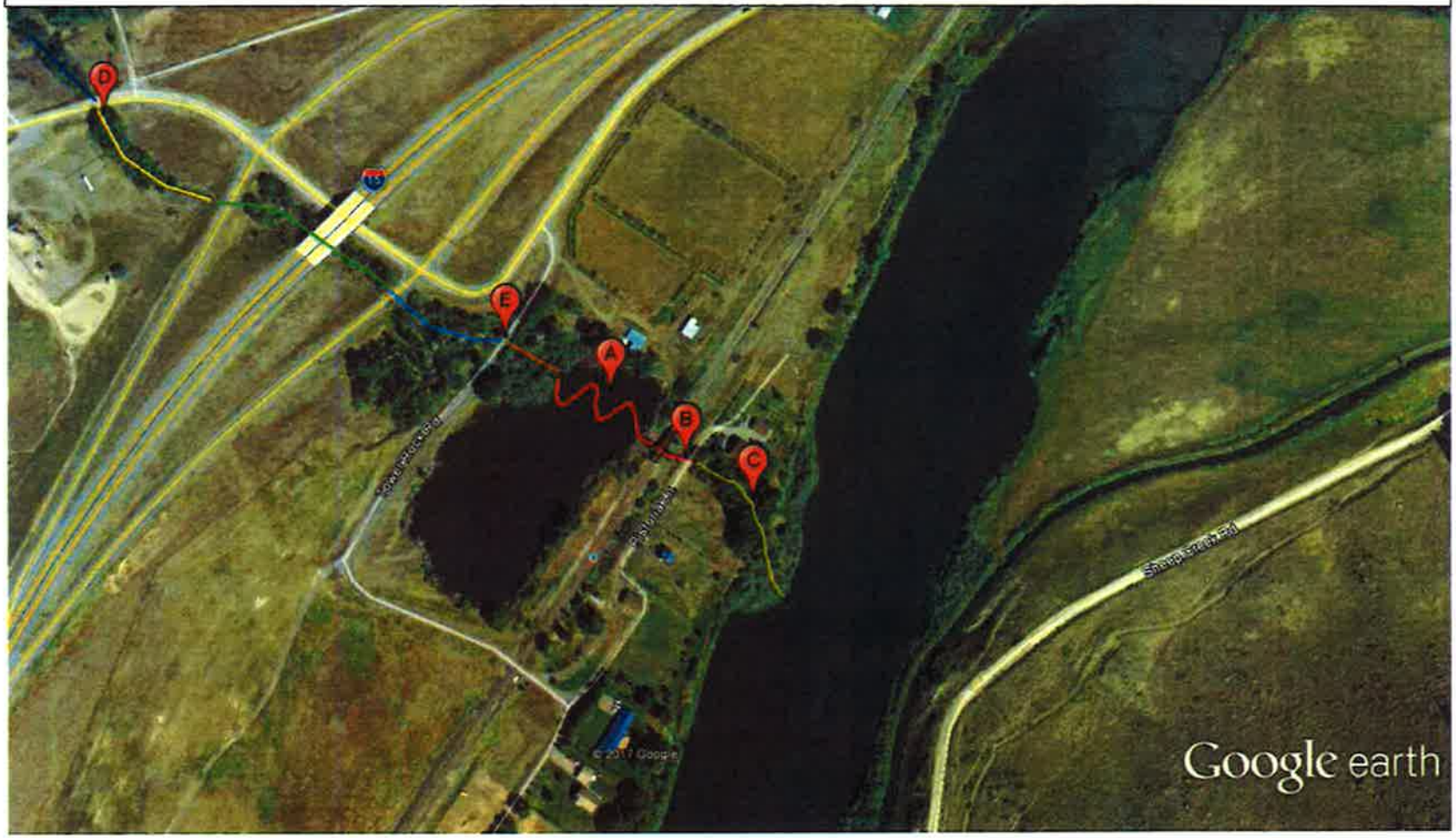
LANDOWNER:
Print Name: Click here to enter name.

Signature of Landowner Date

*CONTRACTOR/AGENT:
Print Name: Click here to enter name.

Signature of Contractor/Agent Date
*Contact agency to determine if contractor signature is required.

Figure 1. Photo of the Hardy Creek project area. The highlighted stream channel is estimated and shown for visual purposes only.



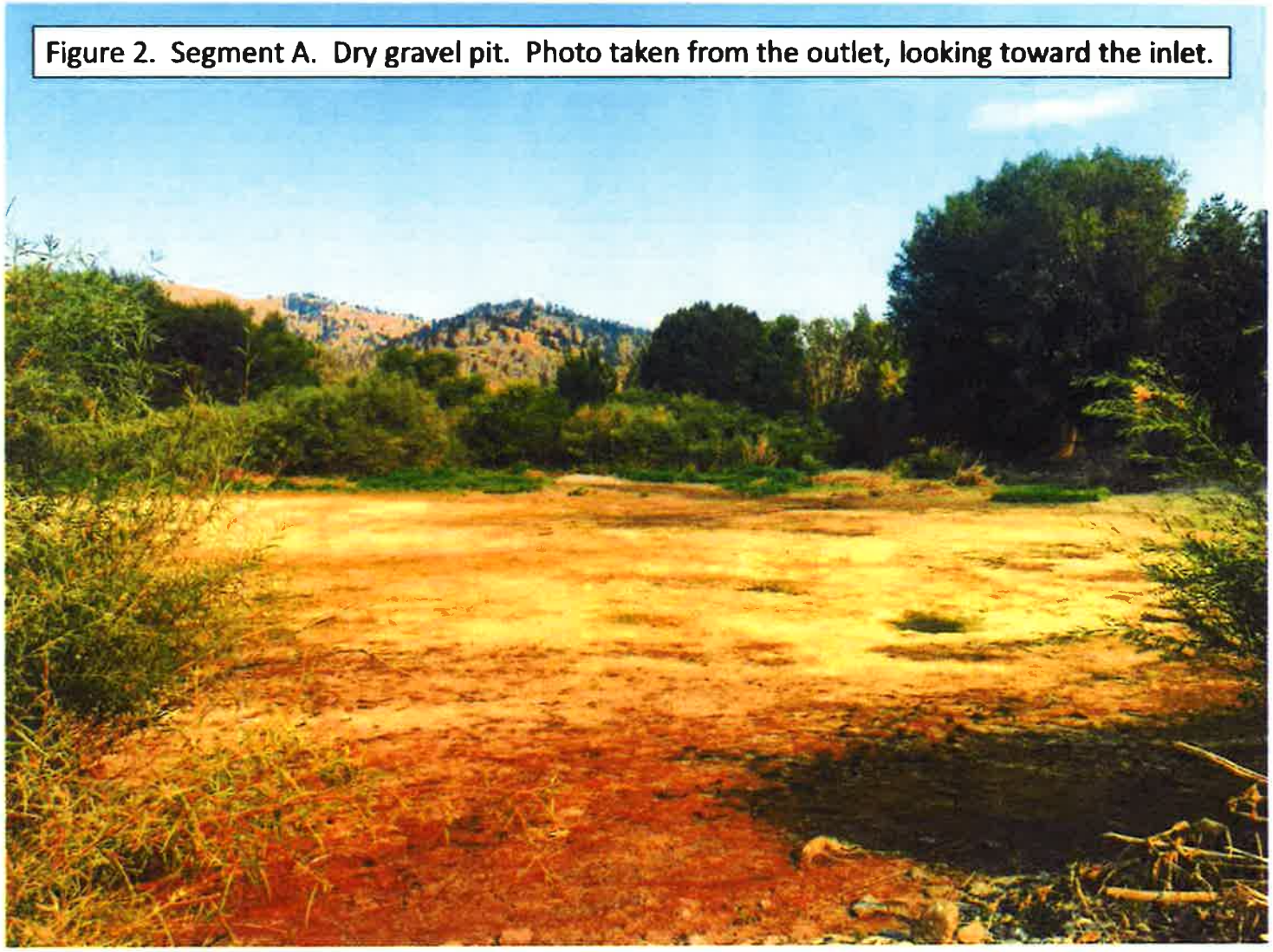


Figure 2. Segment A. Dry gravel pit. Photo taken from the outlet, looking toward the inlet.

Figure 3. Segment A. Dry gravel pit. Photo taken from the north, looking toward the south. Hardy Creek dries up behind the tree on left side of the photo.

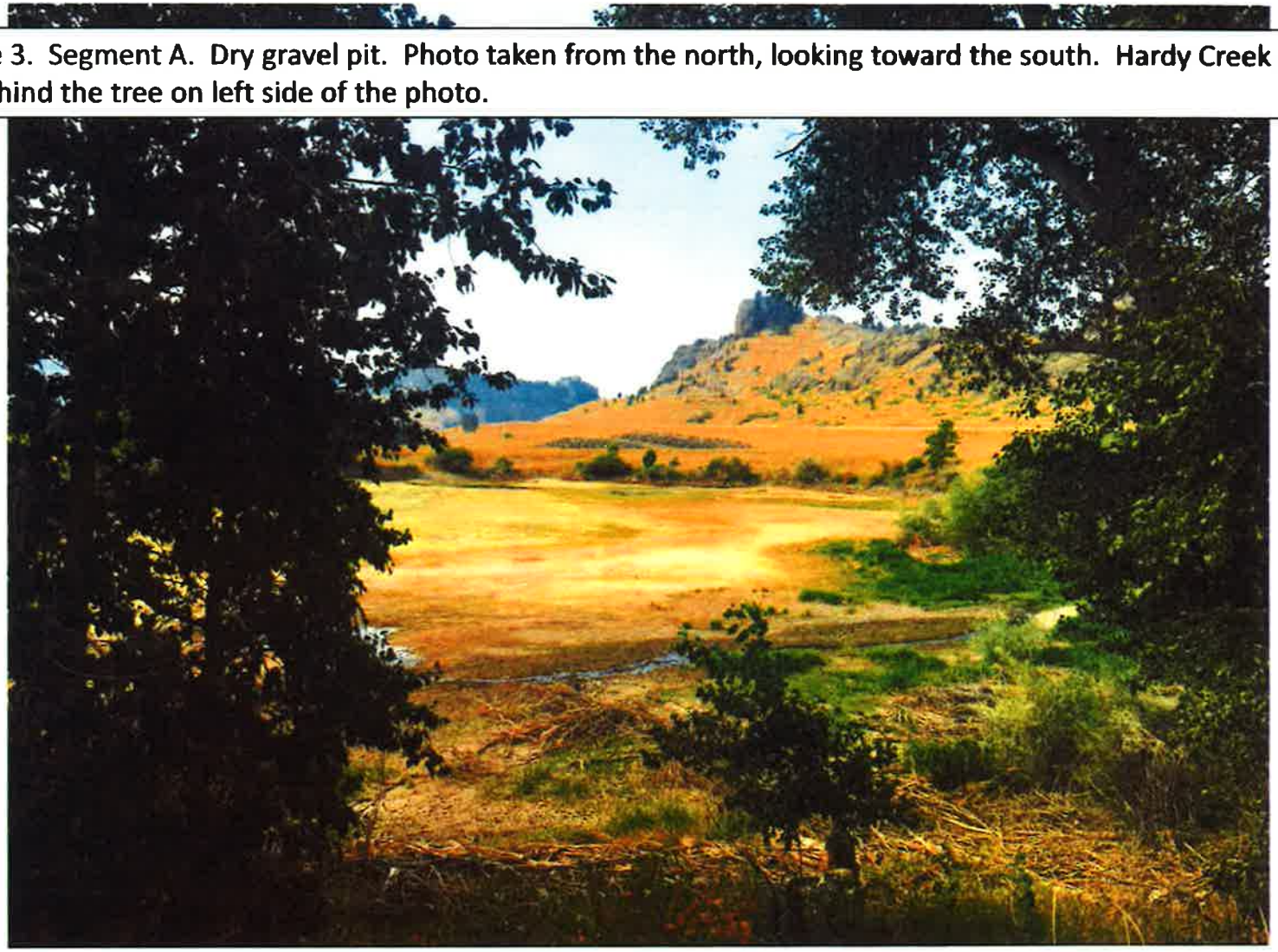


Figure 4. Segment A. Dry gravel pit. Photo taken from the gravel pit and looking at the perched outlet.

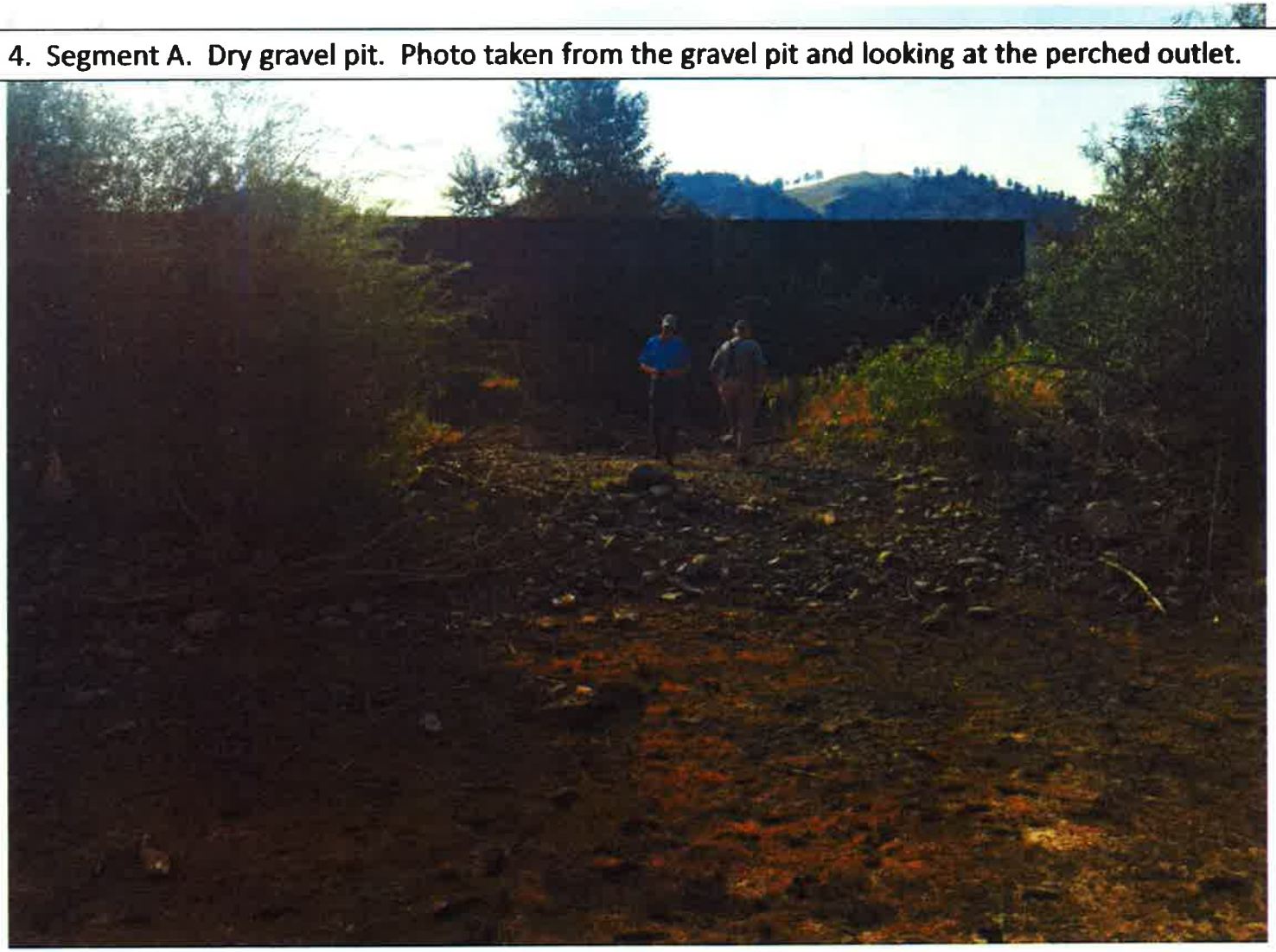


Figure 5. Segment B. Railroad bridge. Stream channel will be centered between the bridge abutments and the streambed will be lowered ~ 2 ft.

Figure 6. Segment B. Downstream road crossing. Culvert will be removed and replaced with a bridge.

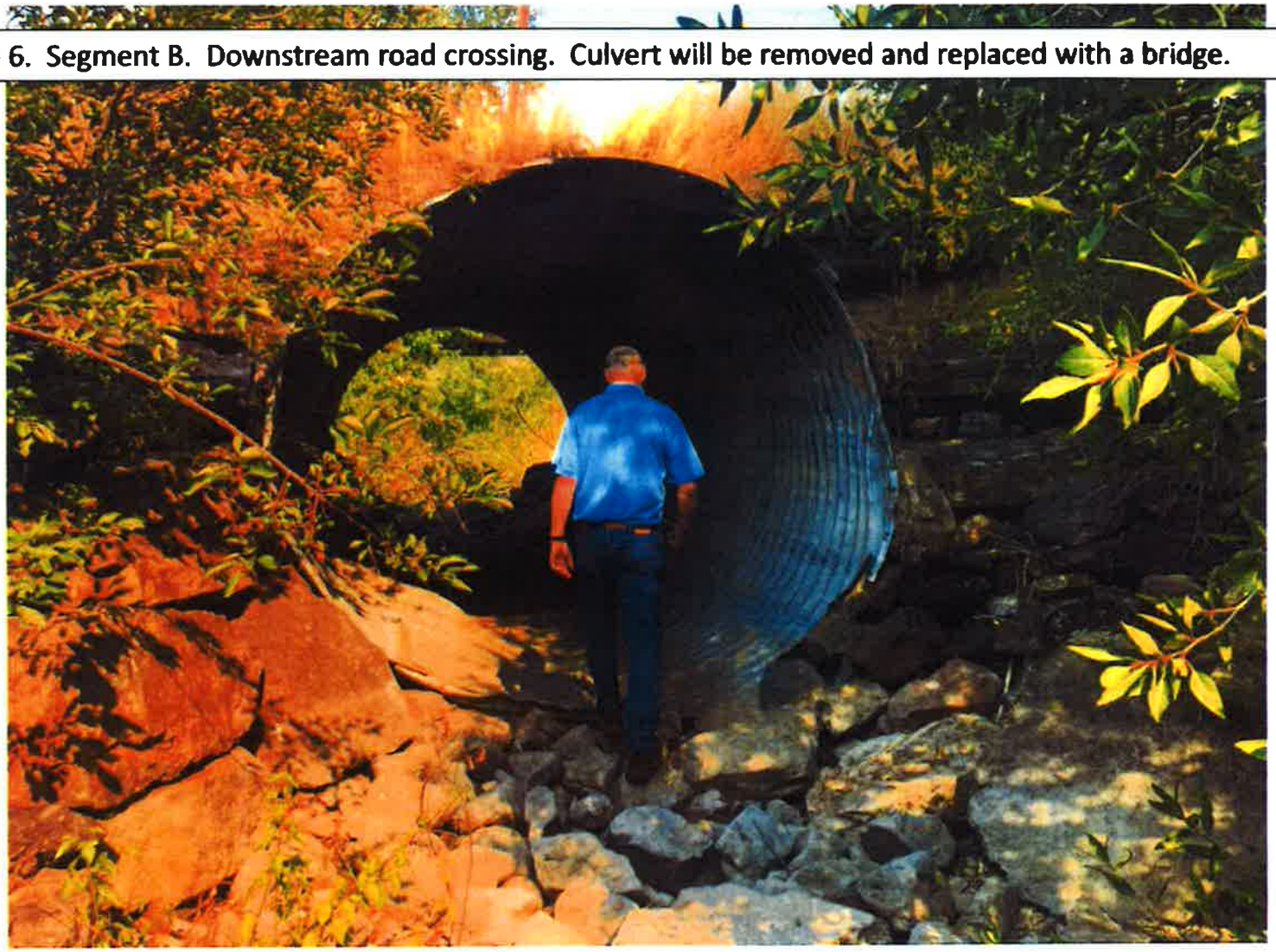


Figure 7. Segment C. Downstream section of Hardy Creek. Poorly defined stream channel due to encroachment of vegetation. Stream channel will be redefined through vegetation.

Figure 8. Segment C. Hardy Creek confluence with the Missouri River. Poorly defined stream channel due to encroachment of vegetation. Stream channel will be redefined through vegetation.

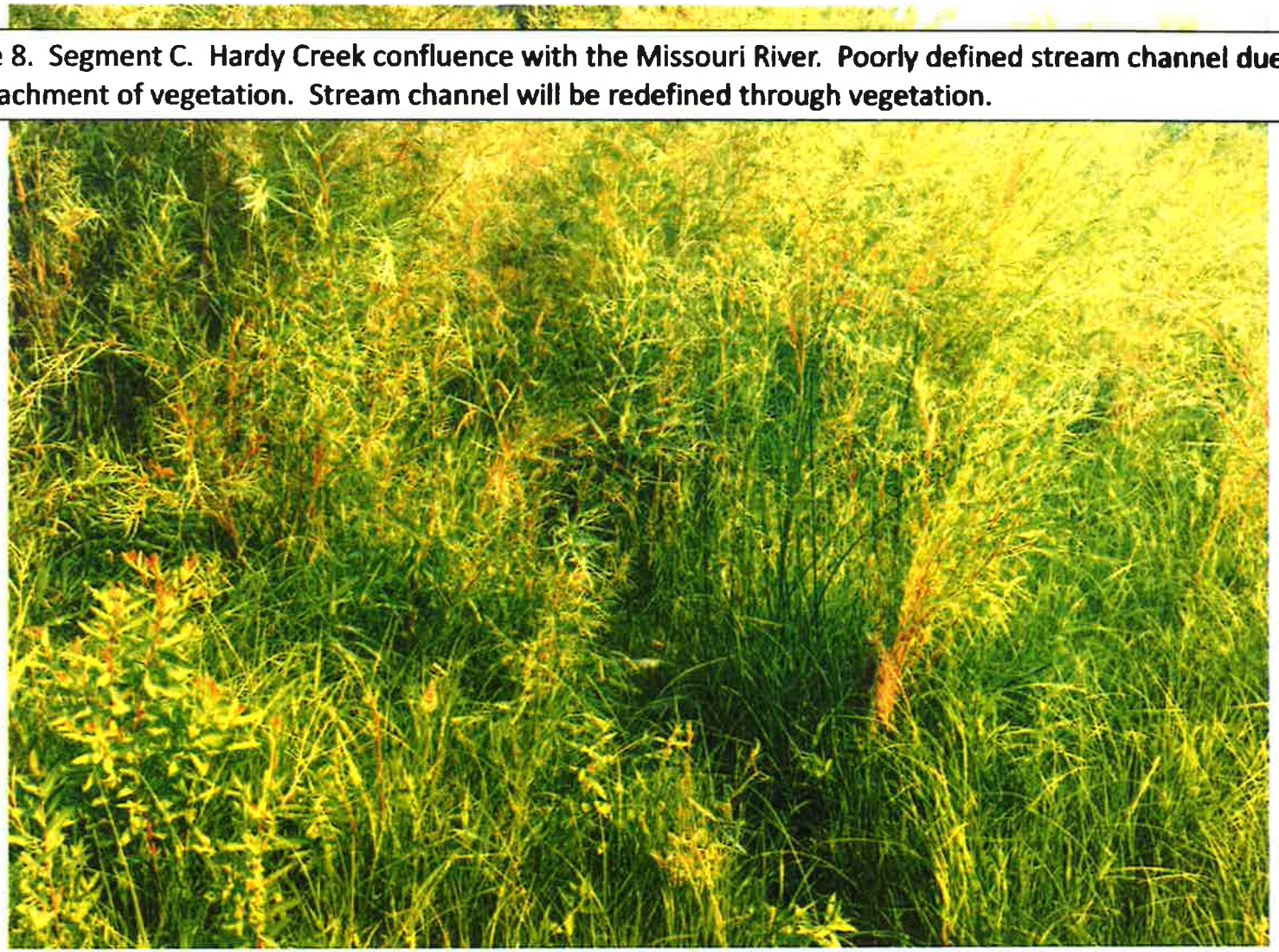


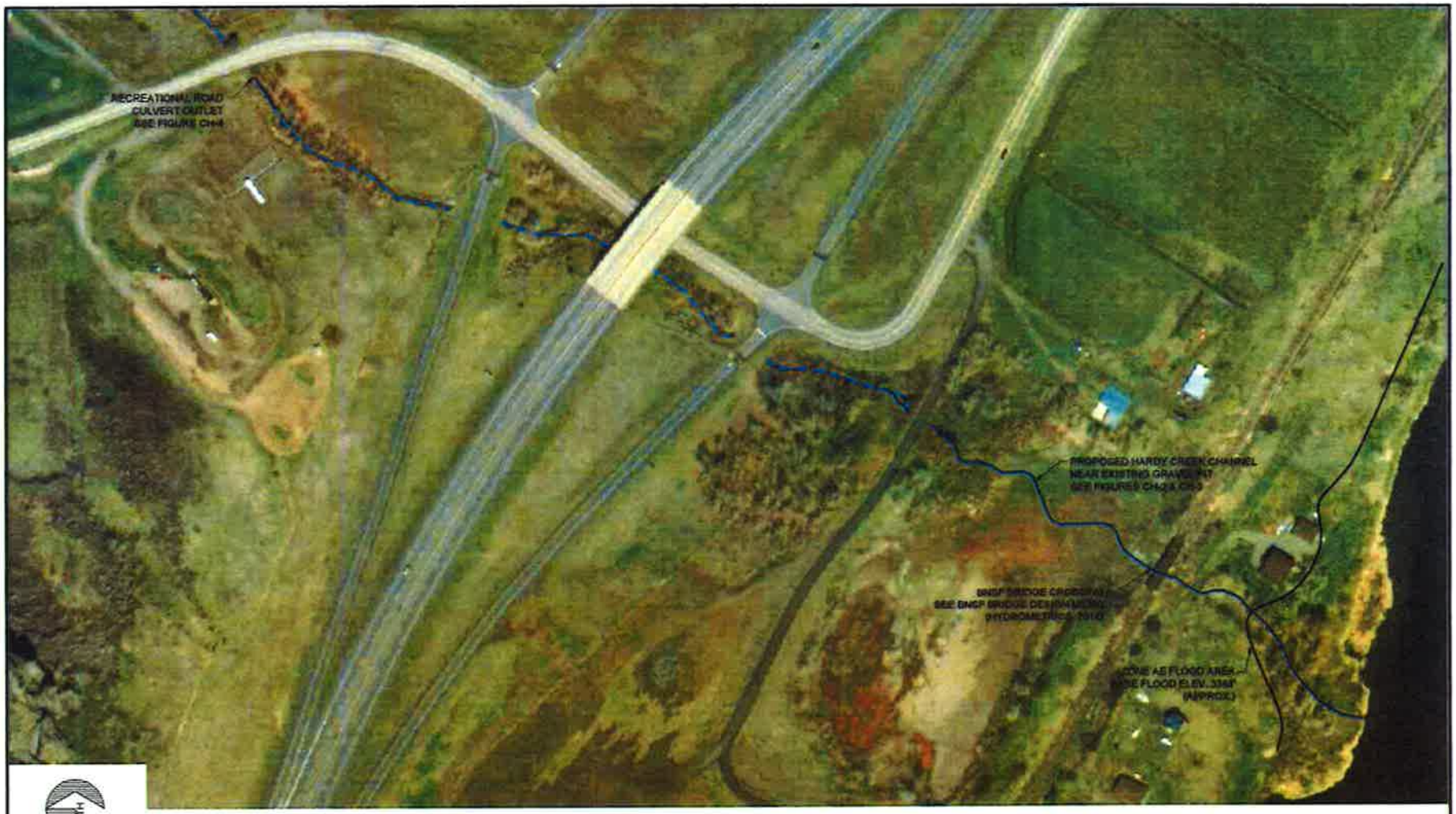
Figure 9. Segment D. Perched culvert at Old Highway 91 resulting in a fish passage barrier. Rock vane structures will be constructed to help pass fish through the culvert.

Figure 10. Segment D. Perched culvert at Old Highway 91 resulting in a fish passage barrier. Rock vane structures will be constructed to help pass fish through the culvert.

Figure 11. Segment E. Poor alignment of stream resulting in stream scour and excessive wood debris blockages of culvert. Stream channel will be realigned to better pass flow, bedload, and debris through culvert.

Figure 12. Segment E. Poor alignment of stream resulting in stream scour and excessive wood debris blockages of culvert. Stream channel will be realigned to better pass flow, bedload, and debris through culvert.

Figure 13. Several rainbow trout were observed in the pool below the Old Highway 91 culvert during spawning season (5/9/2019). The culvert acts as a barrier to movement preventing rainbow trout from accessing suitable spawning habitat upstream. One rainbow trout is highlighted by the red circle.



CHANNEL DESIGN BY MCNEAL RESOURCES, LLC

HARDY CREEK CHANNEL RECONSTRUCTION	SITE OVERVIEW	FIGURE CH-1

Hydrometrics, Inc.
Consulting Scientists and Engineers

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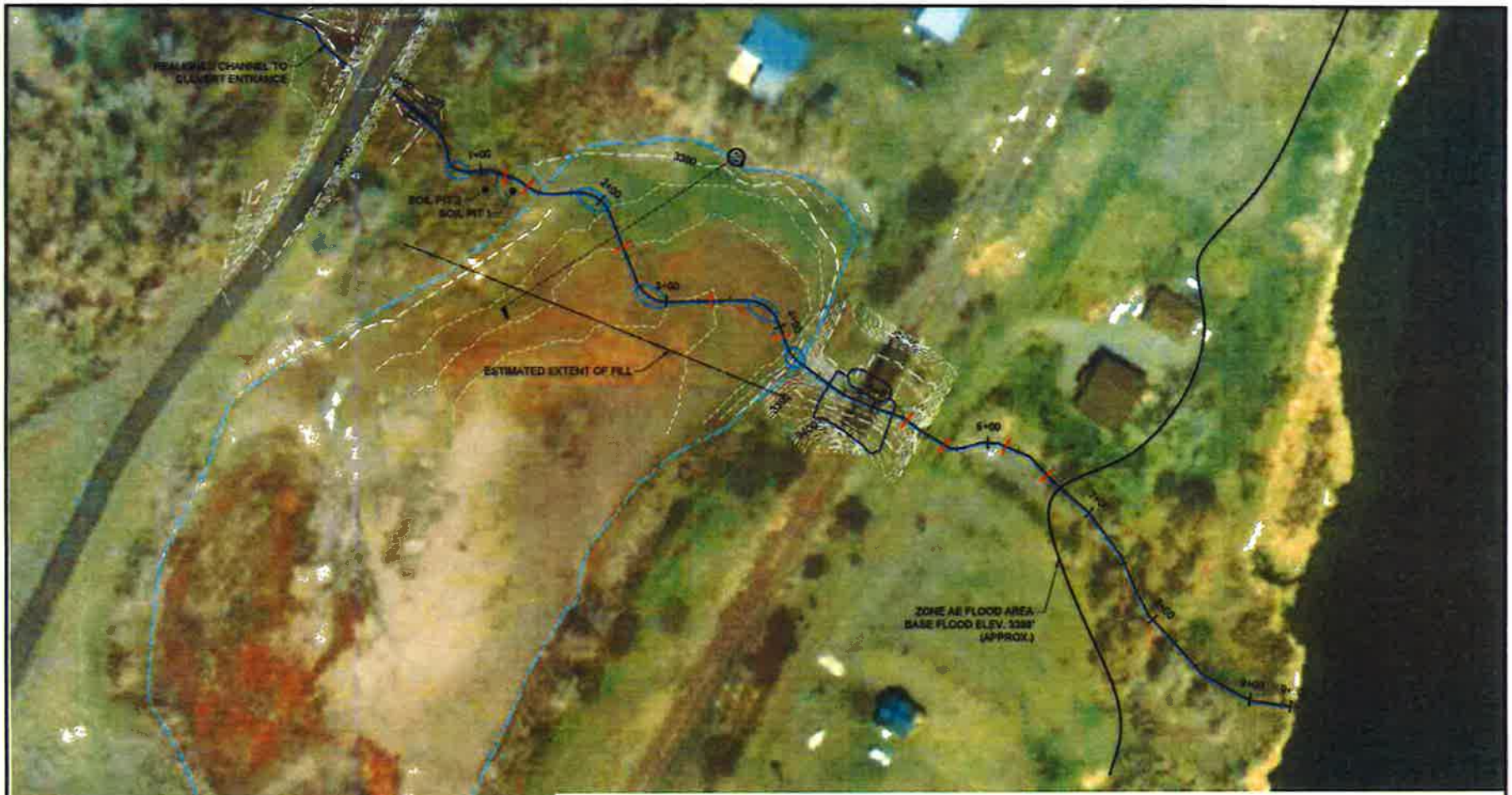

NORTH

SCALE

0 75

LEGEND

- EXISTING CONTOURS (2' & 10')
- PROPOSED CHANNEL ALIGNMENT
- ESTIMATED WETLAND - 0.08 ACRES (APPROX.)
- PROPOSED RIPRAP AT BNSF RR BRIDGE (SEE BRIDGE DESIGN MEMO)
- ROCK/LOG DROP
- LATERAL SCOUR POOL

NOTES:
1. CHANNEL FEATURES SHOWN ARE APPROXIMATE. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD DURING CONSTRUCTION.

HARDY CREEK CHANNEL RECONSTRUCTION

RECONSTRUCTED CHANNEL REACH

FIGURE
CH-2

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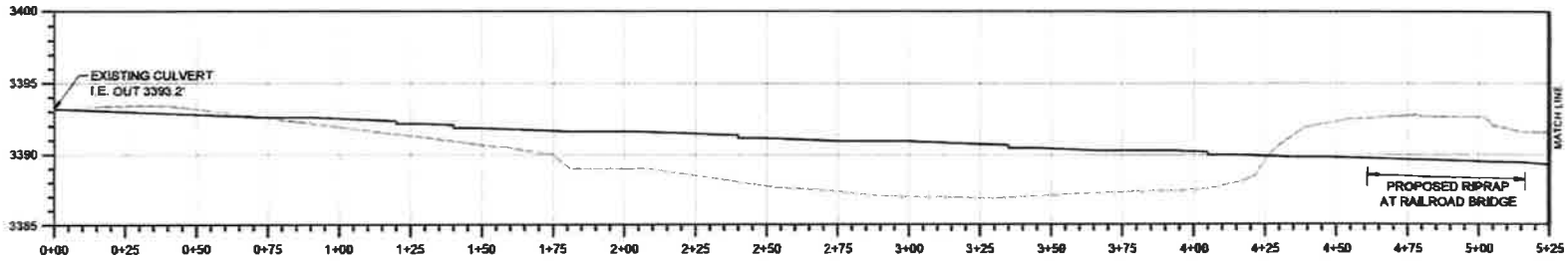
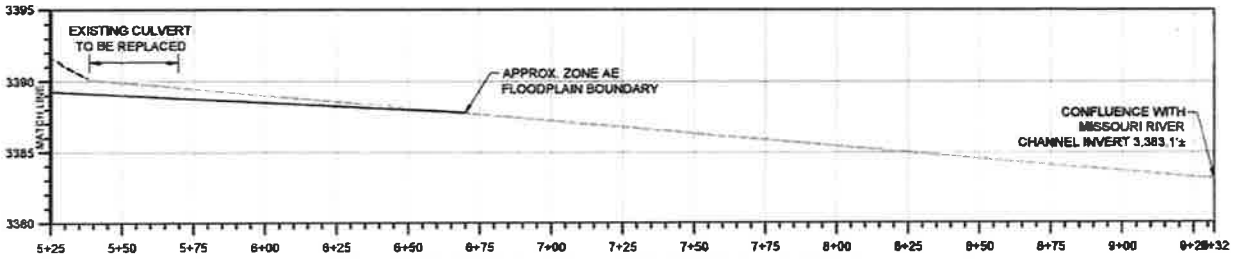
Hydrometrics, Inc.



RECONSTRUCTED CHANNEL PROFILE

1" = 40' (5X VERTICAL EXAGGERATION)



RECONSTRUCTED CHANNEL PROFILE (CONT.)

1" = 40' (5X VERTICAL EXAGGERATION)

LEGEND

EXISTING GROUND PROFILE

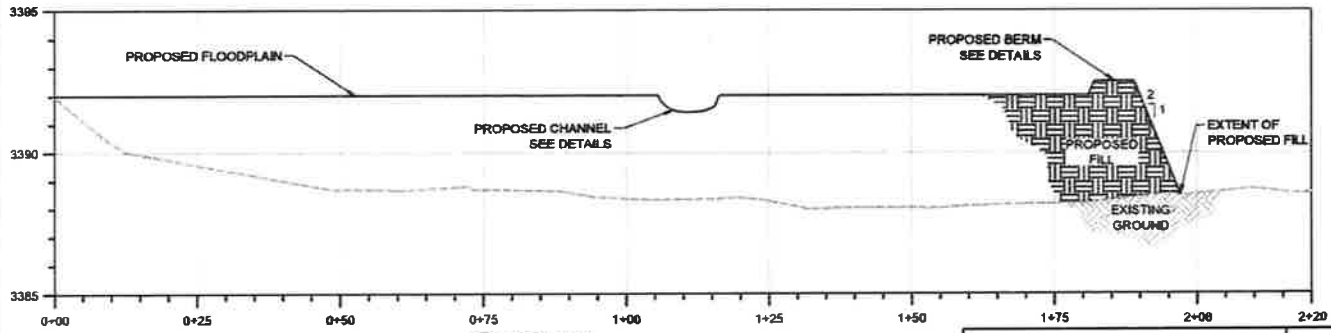
PROPOSED PROFILE

SCALE

0 (In Feet) 40

NOTES:

1. PROFILE AND CHANNEL FEATURES SHOWN ARE APPROXIMATE. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD DURING CONSTRUCTION.
2. APPROXIMATE AVERAGE CHANNEL SLOPES ARE AS FOLLOWS:
   0.008 FT/FT STA 0+00 TO 4+61 RIFFLES
   0.0055 FT/FT STA 4+61 TO 5+16 RAILROAD BRIDGE RIPRAP
   0.016 FT/FT STA 5+16 TO MISSOURI RIVER CONFLUENCE
3. PROPOSED HARDY CREEK CHANNEL FLOODPLAIN WILL BE LEVEL WITH TOP OF CHANNEL BANK.
4. NO ADDITIONAL FILL WILL BE PLACED IN THE ZONE AE FLOODPLAIN.



A SECTION
RECONSTRUCTED CHANNEL
TYPICAL CROSS SECTION
NTS

HARDY CREEK CHANNEL RECONSTRUCTION

RECONSTRUCTED CHANNEL DETAILS

FIGURE
CH-3

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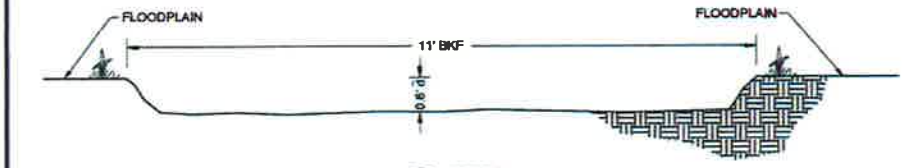
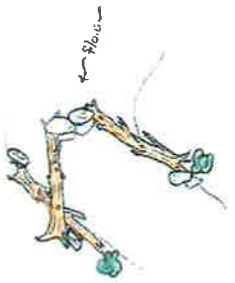
Hydrometrics, Inc.

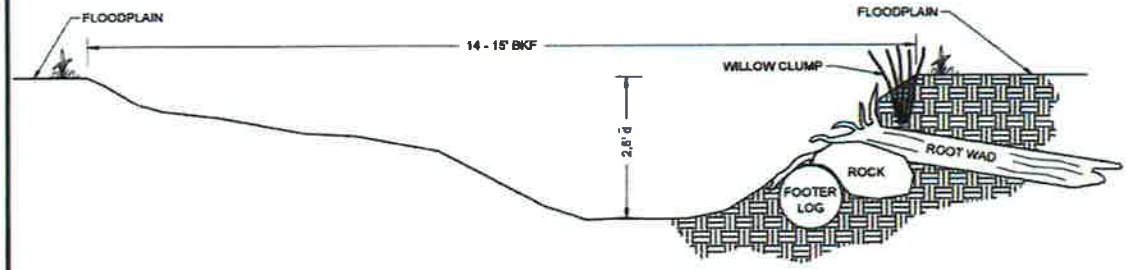


1 DETAIL
RIFFLE REACH (TYP)
NTS



4 DETAIL
DROP STRUCTURE (TYP)
NTS

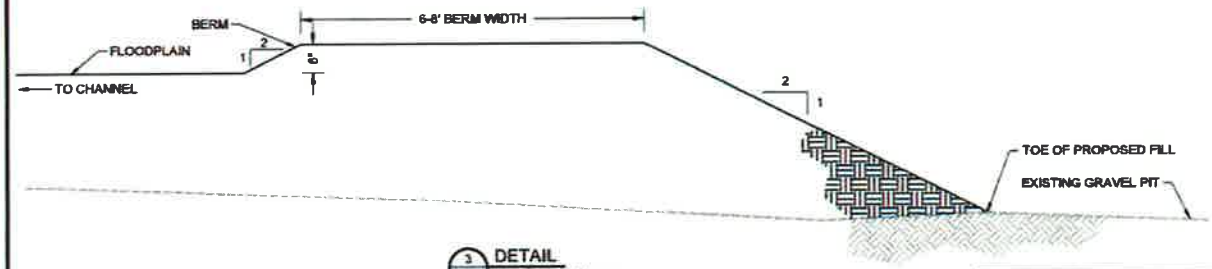
PLAN VIEW



2 DETAIL
CHANNEL BEND & LATERAL SCOUR POOL (TYP)
NTS

SECTION VIEW

5 DETAIL
TREE REVETMENT (TYP)
NTS



3 DETAIL
RIFFLE REACH (TYP)
NTS

6 DETAIL
TREE REVETMENT & ROCK VANE (TYP)
NTS

HARDY CREEK CHANNEL RECONSTRUCTION	RECONSTRUCTED CHANNEL DETAILS	FIGURE CH-4

UPDATE TIME: 9:41 AM
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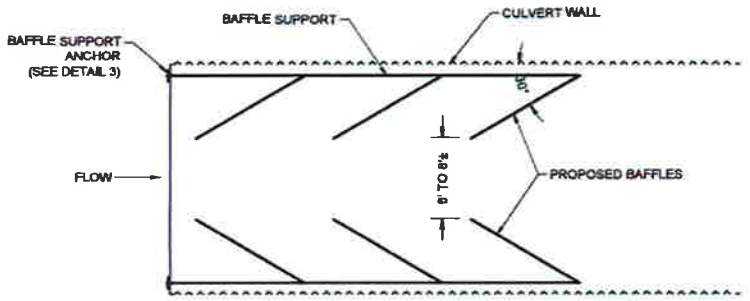
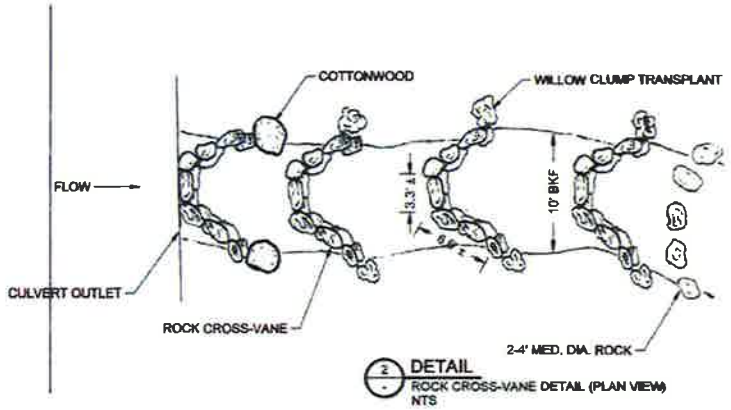
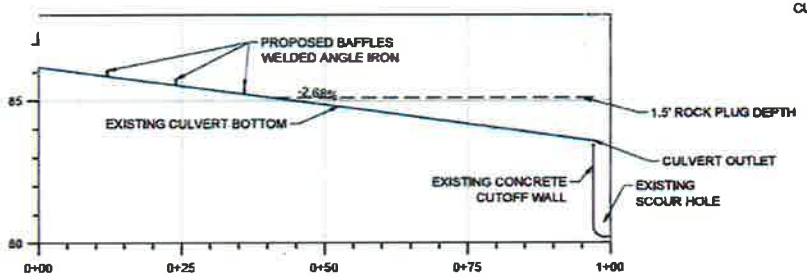
Hydrometrics, Inc.



1 DETAIL
BAFFLE DETAIL (PLAN VIEW)
NTS



2 DETAIL
ROCK CROSS-VANE DETAIL (PLAN VIEW)
NTS



SCALE
(In Feet)
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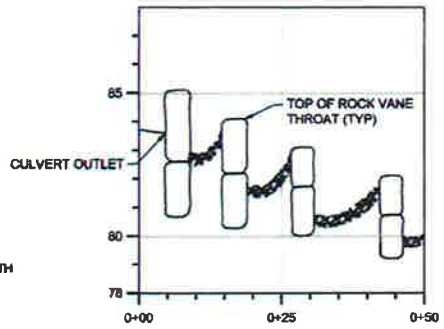
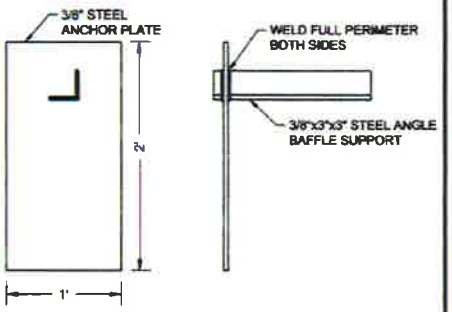
A SECTION
RECREATION ROAD CULVERT PROFILE
1" = 20' (5X VERTICAL EXAGGERATION)



B SECTION
RECREATION ROAD CULVERT
ROCK CROSS-VANE PROFILE
1" = 20' (5X VERTICAL EXAGGERATION)



3 DETAIL
RECREATION ROAD CULVERT
BAFFLE SUPPORT ANCHOR
NTS

NOTES:
1. CUT "L" IN ANCHOR PLATE TO MATCH BAFFLE SUPPORT. INSERT BAFFLE SUPPORT THROUGH HOLE AND WELD THE FULL PERIMETER ON BOTH SIDES OF PLATE. SECURE PLATE AGAINST UPSTREAM CULVERT CUTOFF WALL.
2. SECURE BAFFLES AND BAFFLE SUPPORT WITH BOULDERS IN CULVERT BOTTOM.

HARDY CREEK CHANNEL RECONSTRUCTION	RECREATIONAL ROAD CULVERT DETAILS	FIGURE CH-5

UPDATE TIME: 3:00 PM
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Hydrometrics, Inc.
Consulting Scientists and Engineers

Hydrometrics, Inc.
consulting scientists and engineers

MEMORANDUM

DATE: April 10, 2018

TO: Allen McNeal, McNeal Resources, LLC

FROM: George Metzger, P.E., Hydrometrics, Inc.

SUBJECT: Hardy Creek Channel Design at BNSF Bridge

The reconstruction of a lower reach of Hardy Creek in Cascade County, Montana is proposed to improve fish passage and restore perennial connectivity with the Missouri River. The proposed channel essentially follows the alignment of the existing channel. Approximately 350 feet upstream of its mouth at the Missouri River, Hardy Creek flows under an existing BNSF bridge. As part of channel construction, the channel invert will be lowered by 2 to 3 feet near the existing bridge. The new channel will include riprap armor to support a stable channel reach near the bridge. This memorandum summarizes the design analysis used to assess the channel, and supporting documentation is enclosed as an attachment.

Upstream of the bridge, the channel reach passes a former gravel pit. Stream flows currently back up at the former gravel pit and completely infiltrate during low flows. The channel is being reconstructed to mitigate this issue. Downstream of the bridge the channel crosses Pistoria Lane via a 10-foot diameter culvert. The culvert is being replaced with a new 26-foot span bridge as part of this project. Figure 1 shows the bridge vicinity.

The proposed channel at the bridge will match the general shape of the channel in the adjacent reaches. A trapezoidal channel with a depth of 1 foot, bottom width of 1 foot, and 5:1 (horizontal:vertical) side slopes is proposed at the bridge. Above the 1-foot depth, the channel will have 2:1 side slopes to daylight with existing grade. The reach will be generally straight, with a slight bend to match the adjacent reaches. The bridge includes one intermediate concrete pier. For both the existing and proposed conditions, the main channel is to the south of the pier with a flat flood plain area north of the pier. Draft design drawings showing the channel are included in the Attachment. The channel bottom may be shaped slightly using streambed material to create a more natural channel.

FIGURE 1. AERIAL PHOTO OF BRIDGE VICINITY

Hydraulic conditions under two scenarios were considered. Peak flows were estimated using USGS equations for the Northwest Foothills Region, which includes Hardy Creek (USGS, 2018). A drainage area of 10.64 square miles was determined from aerial imagery and topography, which is consistent with the drainage area estimated by others. Estimated peak discharges for recurrence intervals ranging from 2 to 500 years are shown on the printout in the Attachment.

The estimated 10-year peak discharge is 382 cubic feet per second (cfs). The proposed channel can pass this flow with a water surface elevation below 3,394.5 feet in the project datum, which is the approximate ground elevation at the concrete bridge pier. Average flow velocity is estimated at 5.2 feet per second (fps). The estimated 100-year peak discharge is 1,650 cfs. The proposed channel can pass this flow with a water surface elevation of approximately 3,397.4 feet, which is about 5.1 feet below the bottom flange of the bridge beams. Approximately 75 percent of the flow will be in the main channel south of the pier, and the rest will flow through the overflow area north of the pier. Average velocity will be around 7 fps in the main channel and less than 5 fps in the overflow area. Flow calculations are included in the attachment.

Riprap armoring at the bridge was designed based on the estimated 100-year discharge. Design guidance from the National Cooperative Highway Research Program (NCHRP) was used to specify riprap size (Lagasse et al., 2006). One channel riprap calculation resulted in a required median riprap size of 3.5 inches, while a second calculation resulted in a riprap size with 30 percent of material smaller than 4.6 inches. Both calculations are shown in the Attachment. Based on the calculations, a median stone size of 5 to 7 inches is specified. The

proposed riprap width is from the center pier to an elevation of 3,398 feet along the south abutment, and riprap will extend about 20 feet upstream and downstream of the railroad bridge width. Velocities in the north channel are not anticipated to be erosive for the mix of cobbly soil and sparse vegetation currently in place. Since the bridge pier will be partially submerged during the 100-year flood, riprap armoring for the pier was sized as well. A median size of 9 to 13 inches is specified based on pier riprap calculations. Larger riprap is readily available at the site and may be used as long as layer thickness is increased accordingly. The sandy gravel prevalent at the site is expected to provide suitable subgrade for all riprap. Riprap will be installed per Montana Department of Transportation Standard Specifications.

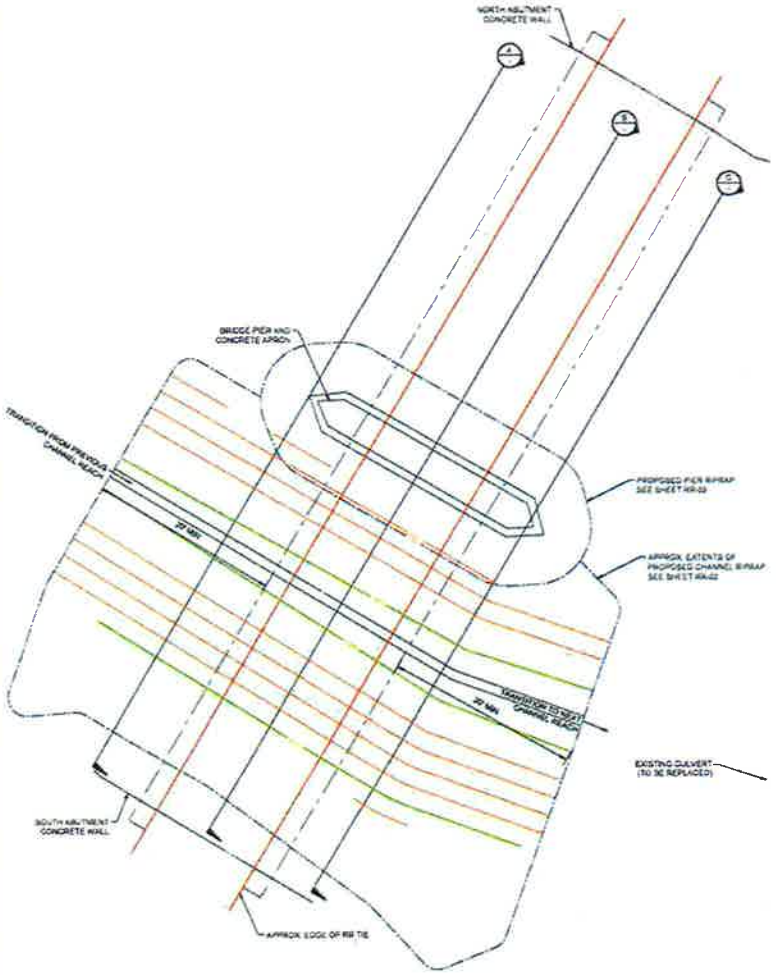
As mentioned previously, the existing 10-foot culvert is slated for replacement with a new bridge. The precise bridge and abutment geometry is yet to be determined, but the general layout is known. Potential backwater at the bridge was estimated using a 26-foot span, 4-foot vertical abutment walls, 1.5:1 abutment slopes, and a 10-foot wide by 1-foot deep trapezoidal channel. The bottom chord of the bridge is expected to be at approximately 3,399.5 feet, which is 10.25 feet above the channel invert. With the water surface just below the bridge clear height, the channel can pass approximately 1,670 cfs. Therefore, the 100-year discharge is expected to have a backwater slightly higher than the elevation of 3,397.4 feet calculated above. If water is backed up by the road, flow velocities at the bridge will decrease and the riprap calculations will be more conservative. The water surface elevation will remain several feet below the bridge beam.

The proposed channel reconstruction near the existing BNSF bridge on Hardy Creek will result in overall improvements at the bridge. Flow capacity will be added by increasing the channel section, and riprap will mitigate potential erosion or channel migration.

REFERENCES

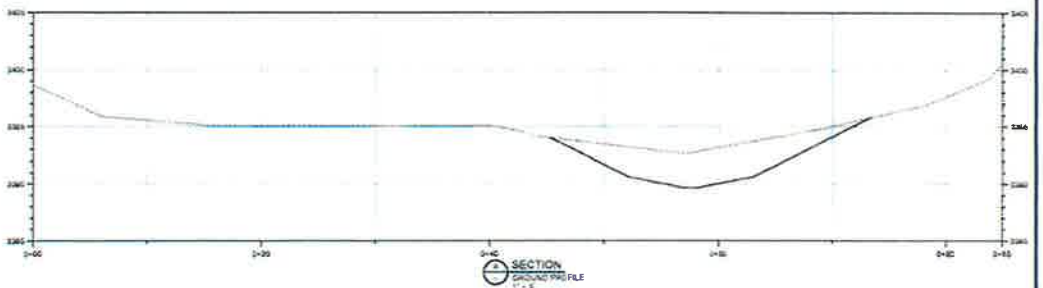
Lagasse, P.F., P.E. Clopper, L.W. Zevenbergen, and J.F. Ruff, 2006. Riprap Design Criteria, Recommended Specifications, and Quality Control. National Cooperative Highway Research Program Report 568. Transportation Research Board.

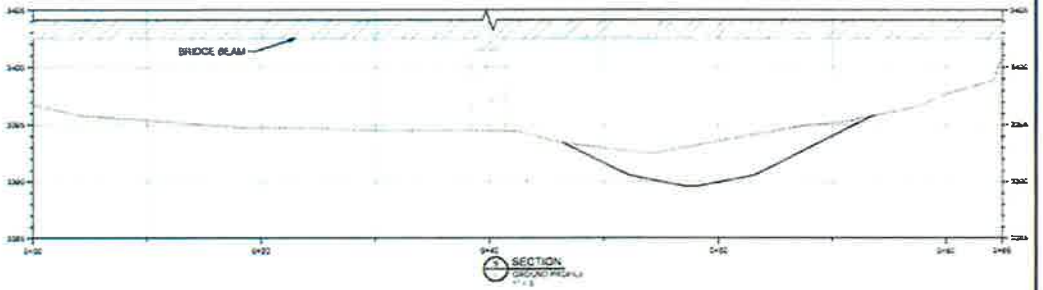
U.S. Geological Survey (USGS), 2018. Montana Flood-Frequency and Basin-Characteristic Data – Methods for Estimating Flood Frequency at Ungaged Sites in Montana. < https://wy-mt.water.usgs.gov/freq?page_type=gen_stats_1> accessed March 2018.



NEW CHANNEL AT BNSF BRIDGE

SCALE: 1" = 5'





LEGEND

- EXISTING CONTOURS (1 & 5)
- PROPOSED CHANNEL CONTOURS (1 & 5)
- BNSF BRIDGE
- EXTENTS OF PROPOSED RIPRAP
- EXISTING GROUND PROFILE
- PROPOSED CHANNEL PROFILE

NORTH

SCALE

5 0 5 10 15

PRELIMINARY NOT FOR CONSTRUCTION

NO.	BY	DATE	REVISIONS	NO.	BY	DATE

SCALE VERIFICATION
IF NOT ONE INCH ON ORIGINAL DRAWING, ADJUST SCALE AS REQUIRED

Project No.	
DRAWN BY	
CHECKED BY	
APPROVED BY	
SCALE	AS NOTED

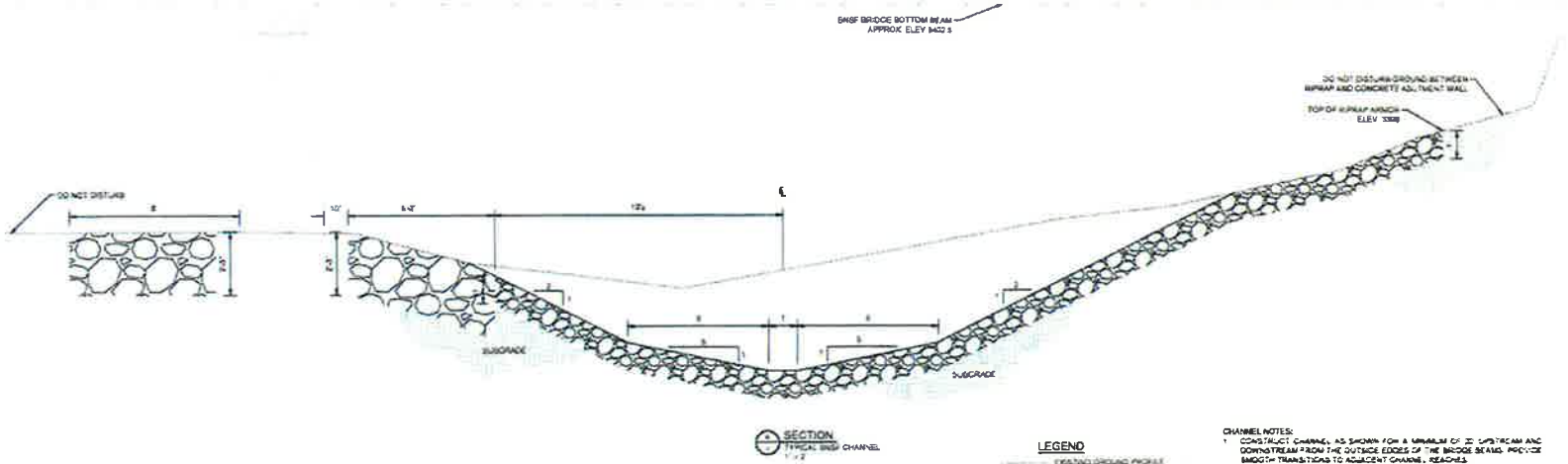
Hydrometrics, Inc.
Consulting Scientists and Engineers
Helena, Montana 59601

HARDY CREEK CHANNEL RECONSTRUCTION

BNSF BRIDGE PLAN AND PROFILES

DRAWING FILE NUMBER
[illegible]

SHEET NUMBER
RR-01



SECTION
TYPICAL BNSF CHANNEL
1" = 2'

LEGEND

EXISTING GROUND PROFILE

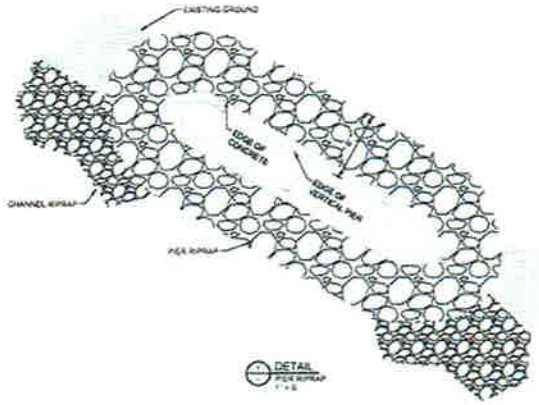
PROPOSED CHANNEL PROFILE

CHANNEL NOTES:

1. CONSTRUCT CHANNEL AS SHOWN FOR A MINIMUM OF 20' UPSTREAM AND DOWNSTREAM FROM THE OUTSIDE EDGES OF THE BRIDGE BEAMS. PROVIDE SMOOTH TRANSITIONS TO ADJACENT CHANNEL REACHES.
2. EXCAVATE AS SPECIFIED IN MDT SPECIFICATION 203
3. PROTECT THE EXISTING STRUCTURE. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY BRIDGE DAMAGE TO THE SATISFACTION OF BNSF AT CONTRACTOR'S EXPENSE.
4. TOP OF RIPRAP MAY BE LOWERED IN CHANNEL TO ACCOMMODATE CHANNEL BED MATERIAL. MAINTAIN MINIMUM RIPRAP THICKNESS.
5. BNSF CHANNEL REACH SHALL BE STRAIGHT AND UNIFORM. MINOR ADJUSTMENTS TO CHANNEL CENTERLINE ARE ACCEPTABLE TO MATCH ADJACENT CHANNEL REACHES. BEND(S) SHALL BE GRADUAL AND SHALL NOT EXCEED 20°.
6. CHANNEL SLOPE SHALL BE UNIFORM THROUGH REACH.
7. PROTECT ESTABLISHED VEGETATION IN PLACE AS DIRECTED. CONSTRUCT RIPRAP AROUND BASE OF PROTECTED VEGETATION.

RIPRAP NOTES:

1. RIPRAP SUBGRADE SHALL CONSIST OF SANDY GRAVEL OR OTHER COARSE SOIL. IF FINER GRAINED SOILS ARE PRESENT OVEREXCAVATE 6 INCHES AND PLACE 3 INCHES OF FILTER MATERIAL MEETING MDT SPECIFICATION 701 FOR FILTER MATERIAL NO. 2.
2. EXCAVATE CAUTIOUSLY ALONG EDGE OF BRIDGE PIER FOR RIPRAP PLACEMENT. SUBSURFACE GEOMETRY IS UNKNOWN.
3. RIPRAP SHALL MEET THE PHYSICAL DESCRIPTION IN MDT SPECIFICATION 701.09 AND THE GRADATIONS SHOWN IN THE TABLES ON THIS SHEET. CONSTRUCT RIPRAP AS SPECIFIED IN MDT SPECIFICATION 213.03.C. RANDOM RIPRAP. RIPRAP MAY BE LARGER THAN THE SPECIFIED GRADATION. RIPRAP THICKNESS MUST BE A MINIMUM OF 1.5 TIMES THE MEDIAN SIZE AND 1X THE MAXIMUM STONE SIZE.



DETAIL
PIER RIPRAP
1" = 5'

CHANNEL RIPRAP GRADATION	
STONE SIZE (IN)	PERCENT PASSING (%)
9	100
6 TO 9	85
3 TO 6	50
2 TO 3	15

PIER RIPRAP GRADATION	
STONE SIZE (IN)	PERCENT PASSING (%)
18	100
11 TO 13	85
9 TO 12	50
3 TO 5	15

PRELIMINARY NOT FOR CONSTRUCTION

NO.	BY	DATE	DESCRIPTION

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

DRAWN BY
CHECKED BY
APPROVED BY
SCALE: AS NOTED
DATE

Hydrometrics, Inc.
Consulting Scientists and Engineers
Helena, Montana 59601

HARDY CREEK CHANNEL RECONSTRUCTION

BNSF BRIDGE DETAILS

DRAWING FILE NUMBER
180080118001

RR-02

USGS

Montana Flood-Frequency and Basin-Characteristic Data

Estimate Flood Discharges at Ungaged Sites in Montana -- (continued)

Summary of Estimation Parameters Selected:

Name for this estimation: Hardy Creek - Basin
Region: Northwest Foothills
Estimation method: Basin and Climatic Characteristics Only
Drainage area in square miles: 10.64

Flood Discharge Estimation:

(In the Flood Discharge table, RI is the Recurrence Interval, in years; STD ERR is the Standard Error; and 90% PRED. INTERVAL is the 90% Prediction Interval, in cubic feet per second)

METHOD: Regression on basin characteristics
Flood frequency estimates for
Hardy Creek - Basin
Northwest Foothills Region: A = 10.64

RI	DISCHARGE (cfs)	STD ERR OF PREDICTION(%)	90% PRED. INTERVAL	
2	58.	95.9	14.3	237.
5	202.	57.1	80.3	510.
10	382.	48.8	170.9	854.
25	740.	47.9	335.6	1630.
50	1130.	51.7	484.4	2640.
100	1650.	57.3	652.1	4160.
200	2330.	63.9	840.4	6450.
500	3540.	73.9	1120.0	11200.

0.044

Flow Capacity Calculations

Existing Railroad Bridge - Channel Sta 4+56±

Bottom beam	3402.5	ft				
Invert	3389.6	ft				
	>10-year discharge			>100-year discharge		
				Main	Overflow	
Water surface elev.	3394.5	ft	Water surface elev.	3397.4		ft
Area	81.0	sq ft	Area	177.8	89.7	sq ft
Perimeter	30.7	ft	Perimeter	43.3	42.1	ft
Top width	28.7	ft	Top width	37.8	38.4	ft
d_{ave}	2.82	ft	d_{ave}	4.70	2.34	ft
Slope	0.54%		Slope	0.54%	0.54%	
manning's n	0.04		manning's n	0.04	0.037	
V	5.21	fps	V	7.01	4.89	fps
Q	422	cfs	Q	1,246	439	cfs
			Total Q	1,685		cfs

Replacement Bridge at Pistoria Lane

Bottom beam	3399.5	ft
Channel Invert	3389.25	ft
A	204.4	ft2
P	37.4	ft
Slope	0.005	
Manning's n	0.04	
V	8.15	ft/s
Q	1,667	cfs

Riprap Sizing, Gradation and Thickness

Methods Discussed in NCHRP Report 568

Median Riprap Particle Size (HEC 11-Design of Riprap Revetment, Section 4.1):

$$D_{50} = \frac{0.001\, C_{SF}\, C_{SG}\, V_a^{\,3}}{d_{avg}^{\,1/2} K_1^{\,3/2}}$$ = median riprap stone size (SI Units)

V_a, avg channel velocity =	7.01	ft/s			
d_{avg}, avg flow depth in the main flow channel =	4.70	ft		Depth at peak flow	
K_1, bank angle correction term = $[1-(\sin^2\Theta/\sin^2\phi)]^{1/2}$, where:					
Θ = the bank angle (deg) with the horizontal =	26.6	=	0.464	rads	H = 2 : V = 1
ϕ = the riprap material's angle (deg) of repose =	38	=	0.663	rads	HEC 11, Fig 25, angular stone
C_{SF} = stability factor coefficient =	1.0		1.2		Stability Factor (from Hec 11, Sec. 4 Table 1)
C_{SG} = specific gravity coefficient =	1.0		2.6		Riprap S.G.
K_1 =	0.69				
D_{50} =	**0.29**	ft			
=	3.5	in	--> Use	**5 inches**	

Riprap Gradation (HEC 11 - Design of Riprap Revetment, Section 4.2):

Stone Size Range (inches)	Stone Size Range (inches)	Percent Passing	Adjusted for Practical Placement (inches)
$1.5D_{50}$ to $1.7D_{50}$	7.5 to 8.5	100	**9**
$1.2D_{50}$ to $1.4D_{50}$	6 to 7	85	**6 to 8**
$1.0D_{50}$ to $1.4D_{50}$	5 to 7	50	**5 to 7**
$0.4D_{50}$ to $0.6D_{50}$	2 to 3	15	**2 to 3**

Riprap Layer Thickness (HEC 11 - Design of Riprap Revetment, Section 4.3):

Should not be less than the spherical diameter of the D_{max} stone, or less than 1.5 times the spherical diameter of the D_{50} stone, whichever results in the greater thickness.

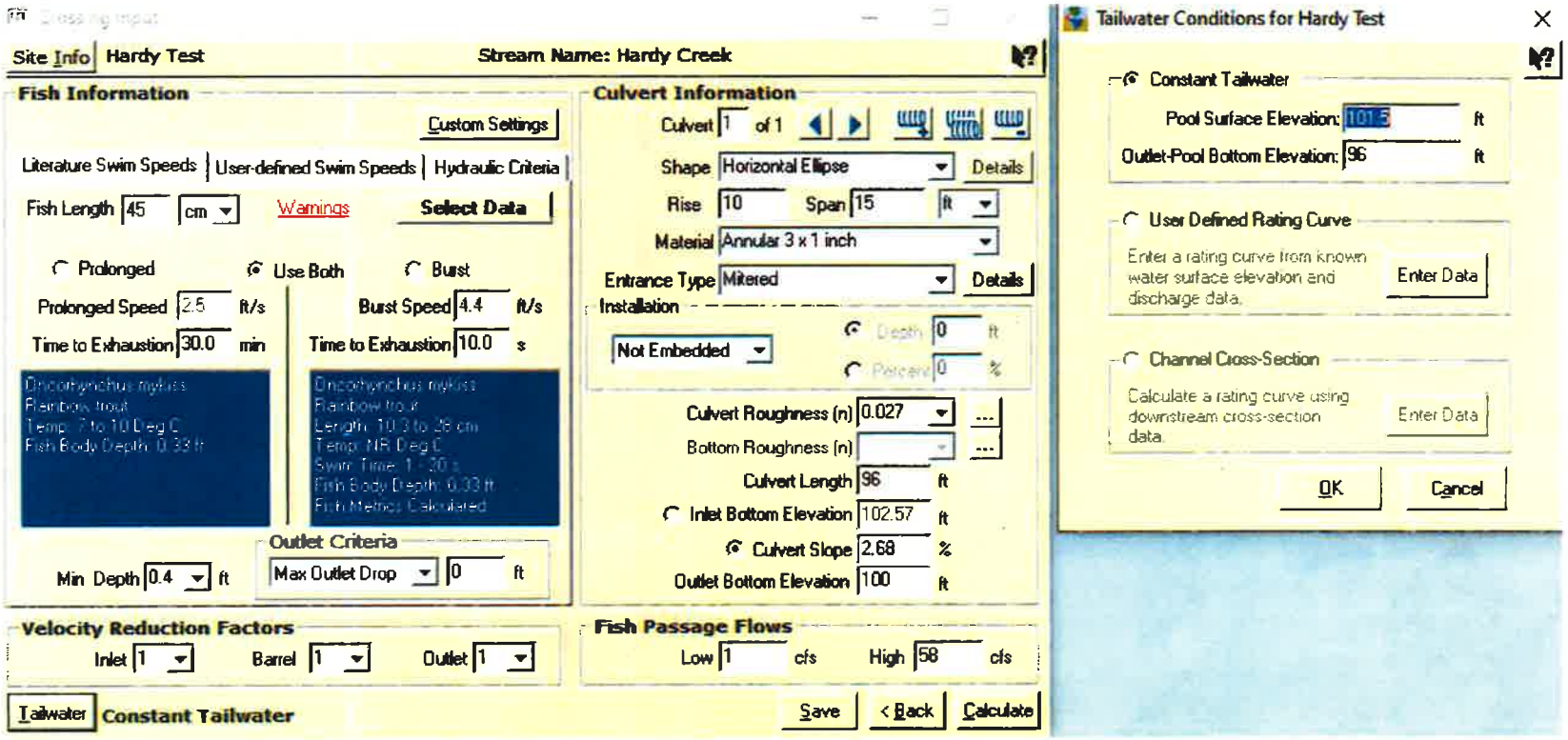
Comparison Calculation - Army Corps of Engineers EM 1601 App B

D_{30} = Sf*Cs*Cv*Ct*d*((w/(s-w))$^{0.5}$*V/sqrt(K1gd))$^{2.5}$

Sf =	1.25		
Cs =	0.3		
Cv =	1		
Ct =	1		
d =	4.70	ft	
w =	62.4	pcf	
s =	162	pcf	
V =	7.01	ft/s	
g =	32.2	ft/s2	
K1 =	0.69		
D_{30} =	0.38	ft =	**4.6 in**

Fish Xing Simulation

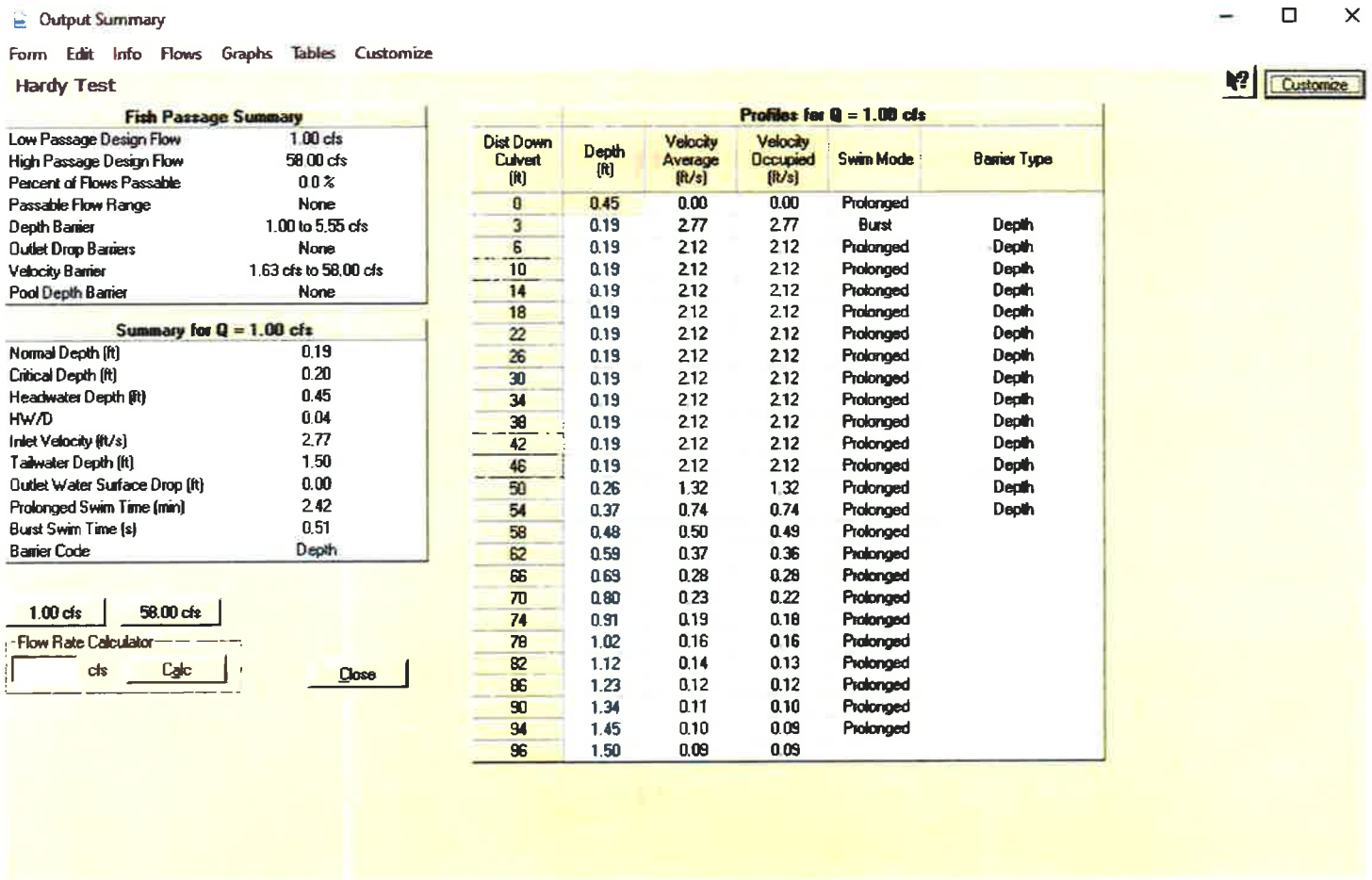
Parameters:

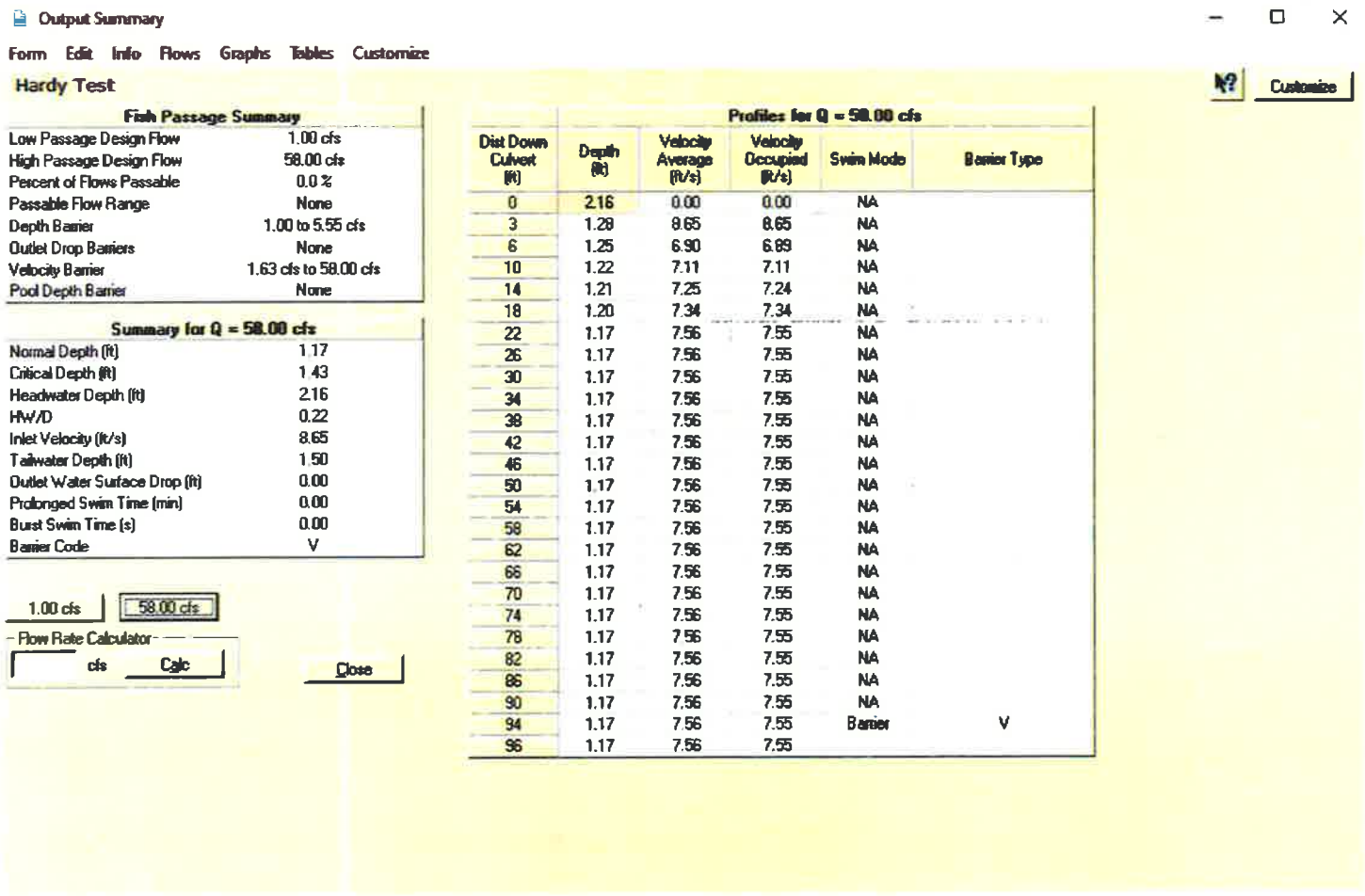


Fish Xing was run with a pool surface elevation of 1.5 ft above the surface of the of the outlet bottom elevation, to match the proposed rock vane design. A minimum depth of 0.4 ft was included as recommended by Fish Xing as swim speeds are only accurate when equal to or greater than the body depth of the fish (0.33 ft). Prolonged and burst swim speeds for rainbow trout for modeling were based on standard values used by Fish Xing based on literature (Burgetz et al. 1998, Hunter and Mayor 1986, Brainbridge 1960). Flow scenarios were run from 1 cfs to 58 cfs, which is the 2-year recurrence interval based on USGS calculations (see Railroad Design Memo).

Results:

Results indicate that depth barriers occurred at flows from 1 to 5.55 cfs and velocity barriers occurred from 1.63 to 58 cfs. Thus, in this scenario 0% of the flows were passable. These results underscore the need for both a rock vane plug that backs water up into the culvert and in-culvert structure to provide resting areas. The design as proposed in the Joint Application, provide both components with a rock plug backing water approximately half way into the culvert and a baffle design with boulders to provide resting areas for fish.




Output Summary
Form Edit Info Flows Graphs Tables Customize
Hardy Test
N?
Customize
Fish Passage Summary
Low Passage Design Flow 1.00 cfs
High Passage Design Flow 58.00 cfs
Percent of Flows Passable 0.0 %
Passable Flow Range None
Depth Barrier 1.00 to 5.55 cfs
Outlet Drop Barriers None
Velocity Barrier 1.63 cfs to 58.00 cfs
Pool Depth Barrier None
Summary for Q = 58.00 cfs
Normal Depth (ft) 1.17
Critical Depth (ft) 1.43
Headwater Depth (ft) 2.16
HW/D 0.22
Inlet Velocity (ft/s) 8.65
Tailwater Depth (ft) 1.50
Outlet Water Surface Drop (ft) 0.00
Prolonged Swim Time (min) 0.00
Burst Swim Time (s) 0.00
Barrier Code V
1.00 cfs
58.00 cfs
Flow Rate Calculator
cfs
Calc
Close
Profiles for Q = 58.00 cfs
Dist Down Culvert (ft) | Depth (ft) | Velocity Average (ft/s) | Velocity Occupied (ft/s) | Swim Mode | Barrier Type
0 2.16 0.00 0.00 NA
3 1.28 8.65 8.65 NA
6 1.25 6.90 6.89 NA
10 1.22 7.11 7.11 NA
14 1.21 7.25 7.24 NA
18 1.20 7.34 7.34 NA
22 1.17 7.56 7.55 NA
26 1.17 7.56 7.55 NA
30 1.17 7.56 7.55 NA
34 1.17 7.56 7.55 NA
38 1.17 7.56 7.55 NA
42 1.17 7.56 7.55 NA
46 1.17 7.56 7.55 NA
50 1.17 7.56 7.55 NA
54 1.17 7.56 7.55 NA
58 1.17 7.56 7.55 NA
62 1.17 7.56 7.55 NA
66 1.17 7.56 7.55 NA
70 1.17 7.56 7.55 NA
74 1.17 7.56 7.55 NA
78 1.17 7.56 7.55 NA
82 1.17 7.56 7.55 NA
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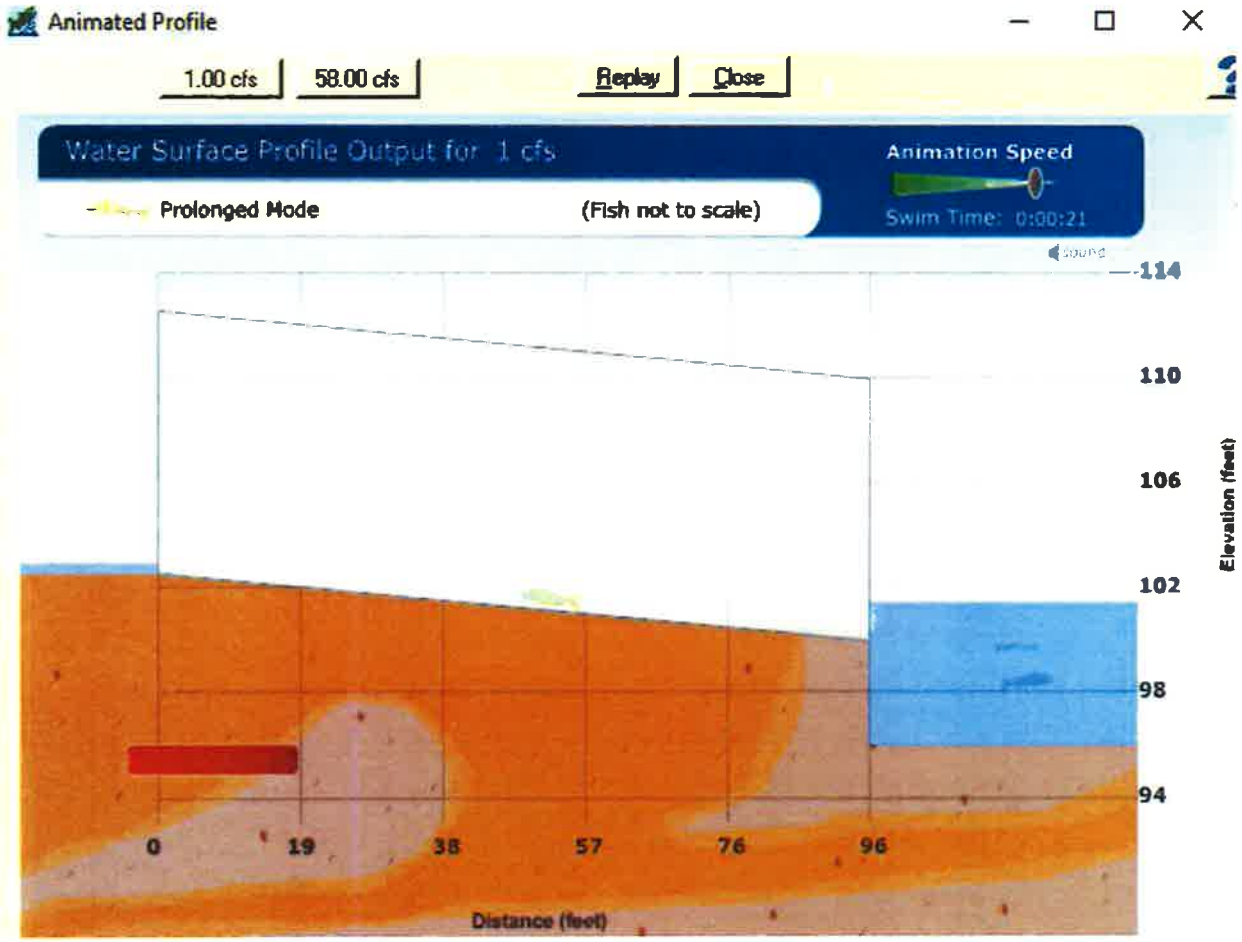
94 1.17 7.56 7.55 Barrier V
96 1.17 7.56 7.55


Animated Profile
1.00 cfs
58.00 cfs
Replay
Close
Water Surface Profile Output for 1 cfs
Prolonged Mode
(Fish not to scale)
Animation Speed
Swim Time: 0:00:21
114
110
106
102
98
94
Elevation (feet)
0
19
38
57
76
96
Distance (feet)

Montana Nationwide Permit 27 Checklist

Stream and Wetland Restoration Activities - Helena Regulatory Office, Omaha District, U.S. Army Corps of Engineers - July 20, 2004 (http://www.nwo.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487700/montana-nationwide-permit-27-checklist/ - Viewed January 25, 2018)

This checklist provides assistance to applicants whose aquatic resource restoration projects in Montana are potentially authorized by Nationwide Permit 27 for STREAM AND WETLAND RESTORATION ACTIVITIES. Inclusion of applicable items from the following informational checklist will expedite review of your project.

1. *Provide a narrative description of the present baseline conditions for the stream, wetlands, and riparian areas. Provide appropriate wetland determination data forms. Identify stream type (ephemeral, intermittent, perennial), and stream order (1st, 2nd, 3rd, etc). Identify the streambank composition. Photographic documentation taken by the applicant or applicant's agent at designated identifiable points (also to be used for future reference to compare/document post project monitoring and success) should be included in describing present-day, pre-project conditions. Provide locations and elevations of bench markers if used.*

See Joint Application. A wetlands survey was completed in 2018 and is submitted as part of the joint application package. Photographs of the study area are included in the supplemental materials to the joint application. Designated bench marks will be established pre-construction for photo points and will be used for monitoring the success of the restoration project. Photos will be taken pre- and post-project as described in Part 19 below.

2. *Describe the existing (and historic, if known) channel planform upstream and downstream of the project area. If available, provide a geomorphologic analysis of historic channel conditions and an analysis of any changes in the channel and watershed. Include an analysis of probable effects of past changes on channel process and form. The level of detail in these analyses should commensurate with the scope of the proposed project. Is the proposed design based on a documented historic condition or on a reference reach? If yes, provide specific descriptive information of the historic conditions or reference reach and describe the applicability to the proposed project reach. Provide the location(s) for any/all reference reach(s).*

As described in the Joint Application, Hardy Creek has substantial anthropogenic disturbance in the lower 0.5 miles after it exits the mountains and before the confluence with the Missouri River. Disturbance in this reach from upstream to downstream, include the Old Highway 91 culvert, on and off ramp culverts to I-15, the Tower Rock Road culvert to the Pistoria Tracts subdivision, a large on-stream gravel pit, and the Creek Crossing road culvert. Upstream of Old Highway 91, the stream channel is less disturbed than the downstream reach. A bedrock drop used to be present a short distance upstream of Old Highway 91 that acted as a barrier to fish movement; however, the stream has laterally migrated around the bedrock and the stream is now passable. The road crossings downstream of Old Highway 91 have restricted the ability of Hardy Creek to move laterally. Despite all the disturbance, Hardy Creek generally has perennial flow until it reaches the gravel pit where some years it goes completely dry

during summer. The proposed design of the new stream channel is based on the dimensions of a reference section upstream of Old Highway 91, as described in the Joint Application. The dimensions of the new channel through the gravel pit and continuing downstream to the Missouri River represent the best solution, given the need to maintain gradient and the restrictions from the upstream culvert and downstream railroad bridge. The streambed will be lowered approximately 2.8 ft at the railroad bridge and 2 ft at the Creek Crossing culvert to maintain grade. The Creek Crossing culvert will be removed and replaced with a bridge which will better pass flow and bedload and allow the channel to maintain grade. Downstream from the Creek Crossing culvert the stream channel will be redefined. This is needed as the presence of the on-stream gravel pit has resulted in the dampening of downstream flows, and thus the channel has become overgrown with vegetation. No new materials will be brought into the floodplain of the Missouri River. Materials will only be repurposed within this section of Hardy Creek, as described in the Joint Application.

3. *Identify the cause(s) of any existing impairments on the proposed project reach and describe how implementation will restore appropriate conditions. Provide rationale for any channel/wetland reconstruction or filling. Be advised that projects that enhance some functions at the expense of other functions may not qualify for Nationwide Permit 27.*

Numerous impairments exist and will be addressed to restore function of the stream. The upstream road crossing at Old Highway 91 acts a fish barrier. The streambed elevation will be raised by constructing four rock weirs, enabling fish to pass the culvert. If approved by MDT, structure will be placed within the culvert to aid in fish passage. The undersized 6-ft culvert at Tower Rock Road is located on a bend resulting frequent clogging of the culvert. The stream channel will be realigned to better pass flow, bedload, and debris. Fill from the south side of the gravel pit will be moved to the north side of the gravel pit to construct a flood plain and stream channel through the gravel pit. Some wetlands may be disturbed in this part of the restoration project. However, it is expected that the amount of wetlands created will be equal to or exceed those that are lost. Additional wetlands will be created along the floodplain of the newly constructed channel through the gravel pit and depressions will be left on the north side of the newly constructed stream to create additional wetlands to mitigate any loss from the wetland fringe around the gravel pit. See wetlands package for additional details. At the railroad bridge, the stream channel will be lowered to maintain grade, centered between the bridge abutments, and armored with rip-rap to protect the abutments. The project has been approved by BNSF railroad and a permit will be acquired from BNSF prior to construction. The Creek Crossing culvert will be removed and replaced with a bridge. The streambed will also be lowered to maintain grade. Downstream of the Creek Crossing culvert the stream channel will be redefined downstream to the Missouri River confluence. All of these actions are designed to restore the function of Hardy Creek, and allow the stream channel to better transport water, bedload, and fish.

4. *Provide a plan view drawing for the entire reach with beginning and ending station numbers, showing placement of all structures and proposed treatments. The plan view should also identify any sections of the reach that are to remain untreated. Identify structures, proposed treatments, and reaches to remain untreated, on an aerial photograph(s), if available. Aerial photograph(s) should show the existing conditions and the proposed design channel.*

See map with aerial photo (Figure 1) and design drawings (Figures CH-1 through CH-5) (rock weirs, meander bends, etc.) attached with joint application.

5. *Provide a detailed longitudinal profile of the existing and proposed design channels, showing station numbers, slopes, and elevations for all existing and proposed features (i.e. pools, riffles, grade control structures, vanes, weirs, culverts, bridges, flood prone areas, etc.)*

See longitudinal profile and design drawings attached with joint application (Figures CH-1 through CH-5).

6. *Include hydraulic and hydrologic evaluation(s) and assessments that preceded the design. Describe any flood flow alterations related to the proposed project.*

See joint application that includes hydraulic assessment for the design. Also see calculations provided in BNSF Design Memo.

7. *Identify the D50 and D84 of the streambed material for the existing condition and the desired D50 and D84 for the proposed project.*

The streambed material existing conditions consists of fines in the gravel pit. The desired D50 and D84 for the restored reach is 20 mm and 70 mm, respectively .

8. *Provide the rationale for installation of grade control, including structures such as vanes, weirs, and similar features. Identify the source(s) of sediment load(s). Generally, natural channel design principles consider that a channel should be re-constructed to an appropriate dimension, pattern, and profile, and should transport sediment and detritus through the constructed reach with minimal artificial structure installation.*

Grade control structures are needed downstream of the Old Highway 91 culvert because the culvert is perched above the streambed resulting in a barrier to fish passage. Constructing a series of rock weirs will build the streambed and water surface elevation back up, allowing fish to pass through the culvert. Grade control structures will also be constructed in the newly reconstructed channel to prevent any headcuts from traveling upstream into the gravel pit restoration reach. This is necessary due to the nature of the disturbed gravel pit area. See joint application (Figures CH-1 through CH-5).

9. *Provide typical drawings of all structures that are proposed within the reach. Include dimensions such as length, width, depth, surface area, depth below constructed bed, size of rock, angle of installation, and slope. Include relative elevation of the structure as compared to the channel bed, especially for cross-channel features.*

See design drawings attached with joint application (Figures CH-1 through CH-5).

10. *Identify the volume of rock or other fill needed for all proposed treatment features for the project. Quantify the amount that will be placed below the OHWM cumulatively and for each structure and/or treatment.*

See Section 10 (Materials) of Joint Application.

11. *Provide an estimation of the volume of material that would be excavated to create a new channel, and an estimate of the amount of fill to be placed in the existing channel, if any. Identify the amount and disposal location for any other projected excess materials generated by the project.*

See Section 10 (Materials) of Joint Application.

12. *Nationwide Permit 27 does not allow conversion of one type of aquatic resource to another type. For example, emergent wetlands cannot be converted to open water. Nationwide Permit 27 does allow the relocation of wetland resources to facilitate projects with a net gain in aquatic resource functions. To demonstrate compliance with this limitation, the applicant must delineate the amount and types of wetlands present pre-project, and compare that to a post-project projection of wetland types that will develop upon project completion. If there will be a net loss in wetland acreage, the applicant must demonstrate an overall net gain in aquatic resource functions through an approved functional assessment methodology to qualify for this nationwide permit. Note: The regulatory definition of a wetland includes an emergent vegetation component.*

See wetland delineation package submitted as part of the Joint Application. We anticipate the same amount or a net increase in wetlands from pre- to post-project.

13. *Identify the specific locations where riparian or wetland sod and/or vegetation will be removed for use in project construction. If vegetation and/or sod will be removed from a wetland, describe specifically how the borrow site will be restored to ensure minimal adverse impact. If excess excavated material is to be placed in a wetland, identify the location, and quantify the amount of fill and the size of area to be filled.*

Care will be taken to minimize disturbance to wetland and riparian vegetation as much as possible during construction. Any disturbed wetland and riparian vegetation will be salvaged and reused as much as possible during the construction process. See wetland delineation package for additional details regarding wetland and riparian disturbance. Some fringe wetland vegetation may be disturbed by constructing the floodplain in Segment A (defined in Joint Application). Wetland vegetation will be salvaged when possible. It is expected there will not be any disturbance to wetlands in the other segment. Some disturbance to riparian vegetation may occur in these other segments; however, riparian vegetation will be reused whenever possible for reconstruction of the streambanks.

14. *Describe Best Management Practices to be used in the project area to reduce/eliminate sediment from entering the stream or wetland. If utilized, describe how installation of temporary diversion structures, pumping operations, or other actions will be undertaken to reduce/eliminate turbidity downstream during construction.*

The restoration work in the gravel pit will need to be completed when the gravel pit is dry or near dry. As a result the stream channel will also be dry downstream of the gravel pit during this time, thus reducing the risk of sediment reaching the Missouri River downstream. If Hardy Creek is flowing at any time during the restoration project, best management practices including the use of silt fences and/or straw bales will be used to eliminate sediment transport downstream in Hardy Creek or to the Missouri

River. All streambanks and any areas disturbed during restoration activities will be reclaimed as soon as possible using native vegetation to establish vegetation and reduce the risk of sediment transport to the stream.

15. *Identify any Threatened and Endangered Species that are or may be present in the project area. When applicable (i.e. Federally funded projects, Future Fisheries projects, etc.), provide documentation that the project has gone through Endangered Species Act consultation with the US Fish and Wildlife Service.*

This project does not utilize any federal funds. The funding entities include state and local Trout Unlimited, Montana Trout Foundation (pending), and Northwestern Energy. Federally listed threatened or endangered (T&E) species in Cascade County, include Pallid Sturgeon, Canada Lynx, Red Knot, Piping Plover, and Grizzly Bear. None of these T&E species would be expected in the project area of lower Hardy Creek, as they either reside downstream of Morony Dam, are more common in remote mountainous country, or are rare and migratory. While several grizzly bear sightings have been confirmed in the Cascade/Lewis and Clark/Megher County area, it would be highly unlikely for an individual to be present in the project area, due to their rarity, the presence of numerous roads, highways, and houses, and the general lack of cover.

16. *Describe the baseline and anticipated post project habitat type(s). Identify target species, if any, the plan will favor.*

The baseline includes a stream that flows into an at-times dry and barren gravel pit. Even when the gravel pit retains water, it rarely flows downstream of the gravel pit to the Missouri River, because of the altered hydrology. The post-project habitat type would be a functioning stream channel from Old Highway 91 downstream to the Missouri River, that is capable of transporting water, bedload, debris, and fish through the multiple culverts and newly constructed channel through the old gravel pit. Currently, rainbow trout, brown trout, brook trout, and sculpin reside in Hardy Creek upstream of the gravel pit, despite the numerous anthropogenic disturbances. The rainbow trout and brown trout are small and likely mostly resident fish. By reconnecting Hardy Creek with the Missouri River, this project will provide additional spawning and rearing habitat for rainbow trout that reside in the Missouri River. We anticipate that rainbow trout will utilize Hardy Creek to spawn, when the stream is reconnected to the Missouri River, which will occur more often than under the pre-restoration condition, as currently the gravel pit must fill first. By increasing the connectivity with the Missouri River and opportunity for rainbow trout to utilize Hardy Creek, the project is expected to enhance the Missouri River fishery and increase its resiliency. The Missouri River was the number one fishery in the state, in terms of the most fishing pressure in 2013 and 2015. Thus, any improvements that can be made to the fishery would provide a direct benefit to the public.

Describe or provide any land use management plan that landowners have agreed to, including plans for fencing, future use of the area, etc., and identify the area included in the management plan on the design plans or maps.

All three private landowners have agreed to the project. The south end of the gravel pit is owned by Montana Department of Transportation. They have agreed to provide rock from their rock storage pile and provide fill from the south end of the gravel pit for constructing the flood plain. MDT has agreed to allow us to realign the stream channel upstream of the 6-ft culvert to better pass water, debris, sediment, and fish. MDT has agreed to allow us to add rock to the streambed to pass fish through the recreation road culvert. Detailed designs in the form of the Joint Application and a MDT right of way application will be provided to MDT to secure the necessary permits. There would be no change in land use as part of this project. There is no agricultural activity in the area. The landowners will sign an agreement to allow us to construct the stream restoration project. The landowners will be free to continue managing their land, following existing laws (e.g., 310 law, etc.).

17. *Describe proposed establishment, restoration, or enhancement activities in riparian areas. Include a planting plan and methods, and identify species, size, numbers, types, and spacing. Describe any temporary irrigation plan, if one is required to establish the vegetation.*

Care will be taken to disturb as little vegetation as possible. Any vegetation that is removed will be reused as much as possible. Revegetation details are included within the Joint Application.

18. *Provide a monitoring plan. For stream restoration projects it is recommended that a representative reach be established that is 10 to 20 bankfull-widths long or the entire restored reach, whichever is less. Monitor lateral and vertical stability after the first bankfull event. The proposed monitoring plan should be designed to include as-built cross sections of constructed features. For projects with a wetland component, wetland delineations and functional assessments must be provided annually until the Corps confirms success. Describe any necessary or proposed maintenance activities.*

See attached monitoring plan.

Hardy Creek Restoration Monitoring Plan
9/12/2019

Objective

The overall objective of this project is to restore the Hardy Creek channel, such that is capable of transporting water, sediment, and fish through the restoration area. Success of the project will be defined by the improvement of the ability to transport water, sediment, and fish through the restoration area compared to pre-project conditions. This includes restoring the Hardy Creek channel from a frequently dry gravel pit and dry channel downstream to the Missouri River, to a more perennial stream through the existing gravel pit and downstream to the Missouri River. While this project will immediately increase the connectivity with the Missouri River by eliminating the need to fill the gravel pit before it can flow to the Missouri River, the stream channel should become more perennial over time as fine sediments drop out and seal the stream bottom.

Monitoring Components

Channel Form

Channel form and stability will be monitored by photo points in each of the restoration reaches at locations established prior to construction. Channel measurements (width and depth) will also be collected at reference locations established prior to construction. Success will be defined by a channel that functions as designed in the ability to transport water, sediment, and fish and is similar to design specifications. Photo points and measurements will be conducted annually for three years after the stream construction.

Bank Vegetation

Bank vegetation will be monitored by photo points in each restoration reach as described above. During construction the number of willow clumps and willow sticks sprigged will be counted. During monitoring the number of alive willow clumps and willow sprigs will be counted to calculate the percent survival. Success will be defined by bank vegetation that is providing adequate bank cover and stability. Photo points and measurements will be conducted annually for three years after the stream construction.

Flow

Currently Hardy Creek must fill the gravel pit before it flows out to the Missouri River. After construction, the channel will have the ability to transport water to the Missouri River for a longer period of time. No quantitative data exists documenting the current extent of flow beyond the gravel pit. After construction the project will be periodically evaluated to determine if flows are maintained downstream of the old gravel pit location for a longer period of time than pre-construction. These evaluations will be completed qualitatively by Montana Fish, Wildlife and Parks personnel and the landowner who lives adjacent to the current gravel pit and has a long-term frame of reference of the extent of flow on Hardy Creek. Success will be defined by a stream that generally flows longer in the stretch downstream of the gravel pit than when it flowed into the gravel pit; however, this will be dependent on the individual flow year. Evaluations will be conducted a minimum of three years post-construction.

Fish

Fish will be monitored through the use of backpack electrofishing and redd counts. Pre-construction electrofishing was conducted in fall 2017 from the upstream edge of the gravel pit to upstream of Old

Hwy 91. The gravel pit and the stream reach downstream, was dry at the time of the monitoring. Redd counts will also be conducted pre-construction in spring 2019 to monitor the potential use of Hardy Creek by rainbow trout from the Missouri River for spawning. Post-construction monitoring will include spring redd counts from the Missouri River to upstream of Old Hwy 91 and fall electrofishing from the downstream edge of the gravel pit to upstream of Old Hwy 91, annually for three years. Success will be defined by continued use of Hardy Creek by fish from upstream of the gravel pit to upstream of Hwy 91, expansion of fish into other habitats compared to pre-construction electrofishing, by the presence of rainbow trout redds during spring surveys, or the presence of increased trout during electrofishing surveys. Success will also be defined by the ability for fish to pass the current fish barrier at Old Hwy 91, which may result in changes in species composition (e.g., more rainbow trout) and/or redds upstream of Hwy 91 post-construction.

Wetland Delineation

The Hardy Creek watershed is a narrow canyon draining into the Missouri River which creates a natural B (step-pool) channel morphology. The stream's natural pattern and profile have been severely disrupted by several road crossings and especially a large gravel pit excavated into its flood plain. Consequently, the only wetland observed in the proposed project area is at the high water mark of the gravel pit and the stream inlet to the abandoned gravel pit (see Fig. CH-2).

The wetland created by water in the gravel pit consists of a 1-2 foot wide swath around the circumference of the pond and the stream channel banks at the pond inlet. Total acreage of this wetland is estimated to be 0.08 acres. Creating a stream channel through the existing pit has the potential to increase the size of this wetland complex with the creation of additional flood plain.

Dominant plant species in the mapped wetland area include narrowleaf or coyote willow (*Salix exigua*), reed canarygrass (*Phalaris arundinacea*), and spike rush (*Eleocharis palustris*). Non-wetland areas in the riparian zone are dominated by quackgrass (*Agropyron repens*), Kentucky bluegrass (*Poa pratensis*), and narrowleaf or coyote willow (*Salix exigua*). Wetland soils are characterized by having about a 2-inch layer of muck over sandy soil.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Hardy Creek/MTFWP City/County: Cascade Sampling Date: 9/21/2018

Applicant/Owner: MTFWP/Peck,Olsen,Grundy State: MT Sampling Point: 1U

Investigator(s): A. McNeal Section, Township, Range: sec 25, T17N, R2W

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 0.1

Subregion (LRR): LRR F Lat: 47.18821 Long: -111.80499 Datum:

Soil Map Unit Name: Gravel pits NWI classification: PEMA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft dia.)			
1. *Salix exigua*	5	Yes	FACW
2. *Rosa woodsii*	5	Yes	FACU
3.			
4.			
5.			
	10 =Total Cover		
Herb Stratum (Plot size: 5 ft dia.)			
1. *Agropyron repens*	15	Yes	FACU
2. *Poa pratensis*	10	Yes	FACU
3. *Juncus balticus*	5	No	FACW
4. *Trifolium repens*	5	No	FACU
5. *Equisetum arvense*	5	No	FAC
6. *Glycyrrhiza lepidota*	4	No	FACU
7. *Cirsium arvense*	4	No	FACU
8.			
9.			
10.			
	48 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	5	x 3 =	15
FACU species	43	x 4 =	172
UPL species	0	x 5 =	0
Column Totals:	58 (A)		207 (B)

Prevalence Index = B/A = 3.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

VEGETATION Continued – Use scientific names of plants.

Sampling Point: 1U

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	=Total Cover		
Sapling/Shrub Stratum			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
	10 =Total Cover		
Herb Stratum			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
	48 =Total Cover		
Woody Vine Stratum			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants less than 3 in. DBH, regardless of height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size.

Woody Vine – All woody vines, regardless of height.

Remarks:

SOIL

Sampling Point: 1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 5/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No X

Remarks:

This data form is revised from Great Plains Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Hardy Creek/MTFWP City/County: Cascade Sampling Date: 9/21/2018

Applicant/Owner: MTFWP/Peck,Olsen,Grundy State: MT Sampling Point: 1W

Investigator(s): A. McNeal Section, Township, Range: sec 25, T17N, R2W

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 0 1

Subregion (LRR): LRR F Lat: 47.18821 Long: -111.80499 Datum:

Soil Map Unit Name: Gravel pits NWI classification: PEMA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Salix exigua*	65	Yes	FACW
2.			
3.			
4.			
5.			
	65	=Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Eleocharis palustris*	5	Yes	OBL
2. *Polygonum aviculare*	1	No	FACU
3. *Agrostis stolonifera*	3	No	FACW
4. *Phalaris arundinacea*	10	Yes	FACW
5. *Mentha arvensis*	2	No	FACW
6.			
7.			
8.			
9.			
10.			
	21	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	1	x 4 =	4
UPL species	0	x 5 =	0
Column Totals:	86 (A)		169 (B)

Prevalence Index = B/A = 1.97

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

VEGETATION Continued – Use scientific names of plants.

Sampling Point 1W

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	=Total Cover		
Sapling/Shrub Stratum			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
	65 =Total Cover		
Herb Stratum			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
	21 =Total Cover		
Woody Vine Stratum			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants less than 3 in. DBH, regardless of height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size.

Woody Vine – All woody vines, regardless of height.

Remarks:

SOIL

Sampling Point: 1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/2						Muck	
2-16	10YR 5/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- X 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ? Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (If observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Great Plains Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

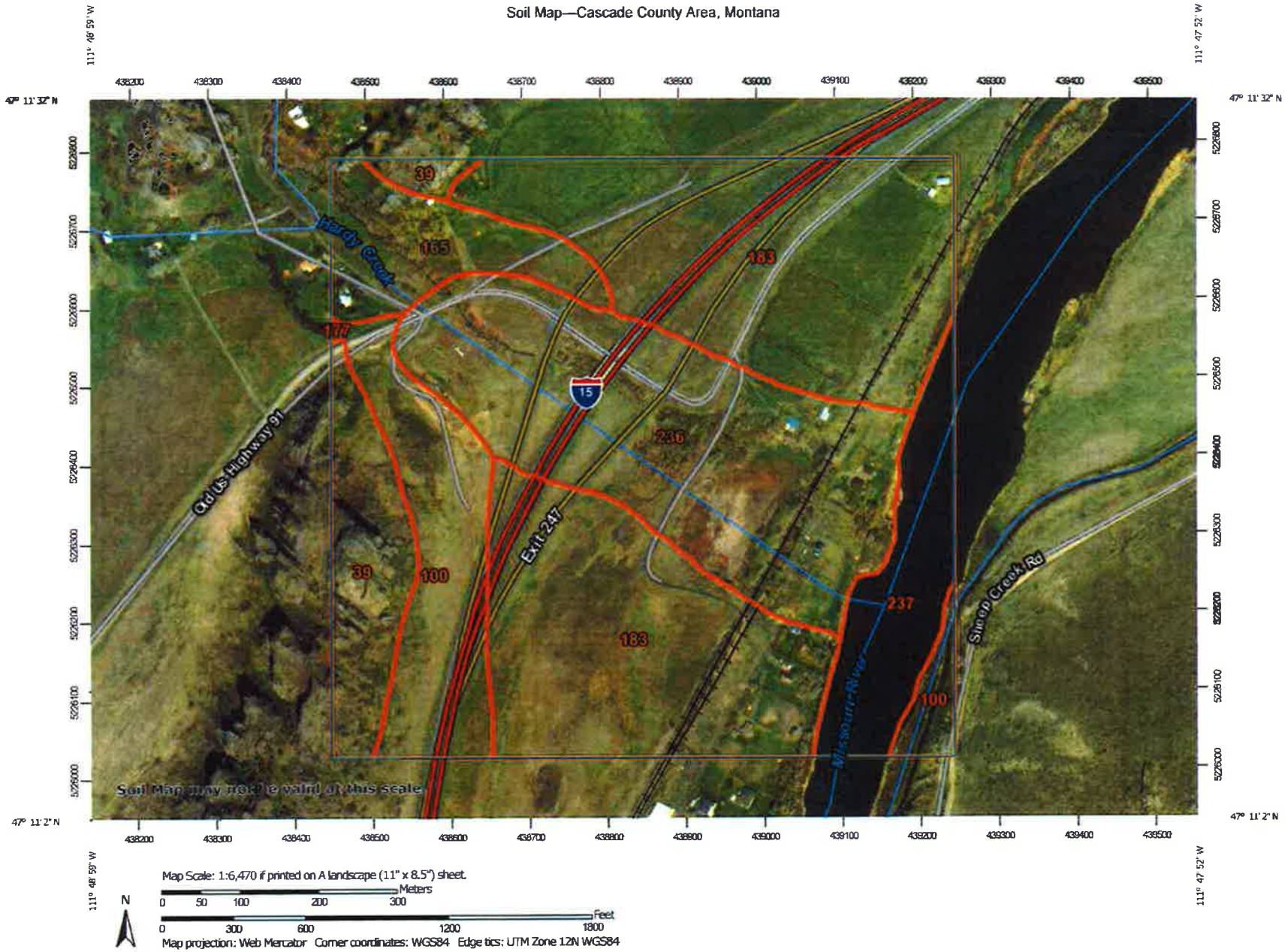
Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 14

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soil Map—Cascade County Area, Montana



Map Scale: 1:6,470 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 50 100 200 300

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cascade County Area, Montana
Survey Area Data: Version 13, Sep 25, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 4, 2013—Feb 15, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
39	Castner-Perma-Rock outcrop complex, 10 to 60 percent slopes	11.3	7.5%
100	Hilger very stony loam, 15 to 50 percent slopes	17.0	11.3%
165	Rivra gravelly sandy loam	9.8	6.5%
177	Shawa loam, 2 to 10 percent slopes	0.1	0.1%
183	Straw loam	63.4	42.0%
236	Gravel pits	38.2	25.3%
237	Water	11.3	7.5%
Totals for Area of Interest		151.1	100.0%

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Montana Department of Transportation
Encroachment Application

2701 Prospect Avenue
PO Box 5895
Helena, MT 59604-5895
Phone: (406) 444-7220
Fax (406) 444-7684
TTY: (406) 444-7696
www.mdt.mt.gov

To be filled in by Department of Transportation Personnel — Print Form

Agreement Number:	Project Number:	Project Name:	ID Number:	County:

Maintenance Section:	Corridor:	Sign Route:	Milepost:	Roadbed:

Montana Department of Transportation | Title | Signature | Date

Subject to the terms and conditions shown on Page 2 hereof; this permit is hereby approved and granted. The "Permittee" agrees to the terms of this permit.

APPLICANT (PROPERTY OWNER)

NATURE OF PERMIT APPLICATION:
(Give sufficient detail to permit thorough understanding and submit blueprints or sketches in triplicate.)
*If work involves Environmental-Related cleanup or monitoring, also complete Section 7.

Need access through right-of way to Hardy Creek and permission to complete work in the right-of-way for stream restoration project. Work includes constructing drop structures to provide fish passage through MDT culvert, replacing a 6-ft culvert with 10-ft culvert to improve stream function and fish passage, and constructing a stream channel through existing gravel pit. See attached.

Township	Section	Range	/	Corridor	Sign Route	Mile Post
17N	25,36	2W				

Name: Jason Mullen - Fish Wildlife & Parks, Fisheries Biologist

Phone\Fax Number: 406-454-5855

Address: 4600 Glant Springs Road

E-mail: jmullen@mt.gov

City: Great Falls **State:** MT **Zip Code:** 59405

If a Corporation, give State of Incorporation and names of President and Secretary

Highway survey stations, milepost, distances to centerline, and distance from right-of-way line near which installations or structures will be installed:

Project area is near the Hardy Creek exit (247). Hardy Creek will be accessed off Old US 91 and Tower Rock Road. See attached maps.

For how long a period is the permit desired?: 2 years. Plan is to complete in 2020 but 2 yr permit would allow for possible delays.

Are there environmental actions involving hazardous waste sites? (Superfund, Spills, Underground Storage Tanks, Old Mines, etc.) If Yes you will need to fill out additional environment questions.

○ **Yes (Complete Page 3)**
◉ **No**

An environmental checklist must be filled out, signed and attached in order for this application to be considered complete.

Link to Environmental Checklist

Montana Fish, Wildlife and Parks
Company or Corporation

Fisheries Biologist
Title

The undersigned, the "Permittee" mentioned in the aforegoing instrument, hereby accepts this permit, together with all of the terms and conditions set forth therein

J A Mullen
Signature

9/12/19
Date

Montana Department of Transportation
Encroachment Application

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Helena, MT 59604-5895
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(INSTRUCTIONS CONCERNING USE OF THIS FORM)

Applicant will complete this form along with plans, sketches and an environmental checklist and send to the appropriate District Maintenance Chief for review and approval.

If the proposed installation will result in significant, permanent or long term impacts to the transportation network in terms of substantial increase traffic volumes, weight or delays to traffic on state roadways, such as major mines greater than five acres, a railroad at -grade crossing, railroad under or overpass, or strip mines, or if the proposed action has permanent impacts to other forms of transportation (rail, transit, or air movement), the encroachment permit must be submitted to the transportation planning division for review prior to issuance of this permit.

Subject to the following terms and conditions, the permit applied for upon the reverse side hereof, is hereby granted:TERM. This permit shall be in full force and effect from the date hereof until revoked as herein provided.REVOCATION. This permit may be revoked by State upon giving **45** days notice to Permittee by ordinary mail, sent to the address shown herein. However, the State may revoke this permit without notice if Permittee violates any of its conditions or terms.COMMENCEMENT OF WORK. No work shall be commenced until Permittee notifies the Maintenance Chief shown in application the date the Permittee proposes to commence work.CHANGES IN HIGHWAY. If State highway changes necessitate changes in structures or installations installed under this permit, Permittee will make necessary changes without expense to State.STATE SAVED HARMLESS FROM CLAIMS. As a consideration of being issued this permit, the Permittee, its successors or assigns, agrees to protect the State and save it harmless from all claims, actions or damage of every kind and description which may accrue to, or be suffered by, any person or persons, corporations or property by reason of the performance of any such work, character of materials used, or manner of installations, maintenance and operation, or by the improper occupancy of said highway right-of-way, and in case any suit or action is brought against the State and arising out of, or by reason of, any of the above causes, the Permittee, its successors or assigns, will, upon notice to them of the commencement of such action, defend the same at its sole cost and expense and satisfy any judgment which may be rendered against the State in any such suit or action.PROTECTION OF TRAFFIC. The Permittee shall protect the work area with traffic control devices that comply with the Manual of Uniform Traffic Control Devices. The Permittee may be required to submit a traffic control plan to the Maintenance Chief for approval prior to starting work. During work, the Maintenance Chief or designee may require the Permittee to use additional traffic control devices to protect traffic or the work area. No road closure shall occur without prior approval from the District Engineer.HIGHWAY AND DRAINAGE. If the work done under this permit interferes in any way with the drainage of the State highway affected. Permittee shall, at the Permittee's expense, make such provisions as the State may direct to remedy the interference.RUBBISH AND DEBRIS. Upon completion of work contemplated under this permit, all rubbish and debris shall be immediately removed and the roadway and roadside left in a neat and presentable condition satisfactory to the State.INSPECTION. The installation authorized by this permit shall be in compliance with the attached plan and the conditions of this permit. The Permittee may be required to remove or revise the installation, at sole expense of Permittee, if the installation does not conform with the requirements of this permit or the attached plan.STATE'S RIGHT NOT TO BE INTERFERED WITH. All changes, reconstruction or relocation shall be done by Permittee so as to cause the least interference with any of the State's work, and the State shall not be liable for any damage to the Permittee by reason of any such work by the State, its agents, contractors or representatives, or by the exercise of any rights by the State upon the highways by the installations or structures placed under this permit.REMOVAL OF INSTALLATIONS OR STRUCTURES. Unless waived by the State, upon termination of this permit, the Permittee shall remove the installations or structures installed under this permit at no cost to the State and restore the premises to the prior existing condition, reasonable and ordinary wear and tear and damage by the elements, or by circumstances over which the Permittee has no control, excepted.MAINTENANCE AT EXPENSE OF PERMITTEE. Permittee shall maintain, at its sole expense, the installations and structures for which this permit is granted, in a condition satisfactory to the State.STATE NOT LIABLE FOR DAMAGE TO INSTALLATIONS. In accepting this permit, the Permittee agrees that any damage or injury done to said installations or structures by a contractor working for the State, or by any State employee engaged in construction, alteration, repair, maintenance or improvement of the State highway, shall be at the sole expense of the Permittee.STATE TO BE REIMBURSED FOR REPAIRING ROADWAY. Upon being billed, therefore, Permittee agrees to promptly reimburse State for any expense incurred in repairing surface of roadway due to settlement at installation, or for any other damage to roadway as a result of the work performed under this permit.The Permittee shall not discharge

20. OTHER CONDIDTIONS AND/OR REMARKS:

21. ☐ See attached addendum

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Montana Department of Transportation
Encroachment Application

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Additional Environmental Questions Pertaining to Environmental actions involving hazardous waste sites (Superfund, Spills, Underground Storage Tanks, Old Mines, etc.)

Name of Facility:

Facility ID:

Address: **City** **State** **Zip Code**

MT

Check Boxes that are applicable below and provide subsequent details

☐ **Leaking underground storage tank site?** **MDEQ identification number** ☐ **Petro Fund Eligible?**

☐ **Remediation Response Sites (State Superfund Site)?** **identification number and/or site name**

☐ **Federal Superfund Site?** **identification number and/or site name**

☐ **Is Mine Active or Abandoned?** **Mine Site ID#** **Mine Description or Name**

☐ **Spill?** **Spill Site** **Spill Description**

Other Environmental Action

Traffic Control Plan Attached? ○ **Yes** ○ **No**

For each well installed in MDT R/W, provide GPS coordinates in state plane coordinates (preferred) or well survey information in another format (continue on another sheet if necessary).

NOTE: Each well request needs to be submitted on a separate application form.

Add Well	Well Designation	Easting	Northing
X			
X			
X			

The undersigned, the "Permittee" mentioned in the aforegoing

MDT-ENV-006 04/17

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Montana Department of Transportation Environmental Checklist

2701 Prospect Avenue
PO Box 201001
Helena, MT 59620-1001
Phone: (406) 444-7228
Fax (406) 444-7245
TTY: (406) 444-7696
www.mdt.mt.gov

(*For MDT Use Only*)

Date	Choose type of Environmental Checklist:
8/18/2019	Encroachment/Occupancy (including Utility)

Location

Highway or Route:	Milepost(s):
Old US 91 and Tower Rock Road	

Physical Address:	City:
2325 Old US Hwy 91	Cascade

Legal Description:	County:
S36, T17 N, R02 W, IN W2 MK S W OF HW	Cascade

Township:	Range:	Section(s):
17N	2W	25,36

Applicant Information:

Name:	Title
Jason Mullen	Fisheries Biologist

Company/Utility:
MT Fish Wildlife and Parks

Mailing Address:	Phone:
4600 Giant Springs Road	406-454-5855

City:	State:	Zip:	Business Phone:
Great Falls	MT	59405	406-454-5855

Montana Environmental Checklist Help Guide (click button to view) Guide

Impact Questions Actions that qualify for Categorical Exclusion under MEPA and/or NEPA (See ARM 18.2.261 and 23 CFR 771.117) (See ARM 18.2.261 and 23 CFR 771.117)		Comment, Expl, and/or Information Source (Attach supporting information, as necessary.)
1	Will the proposed action impact any known historical or archaeological site(s)?	C1
2	Will the proposed action impact any publicly owned parkland(s), recreation area(s), wildlife or waterfowl refuge(s)?	C2
3	Will the proposed action impact prime farmlands? (If yes, attach a completed Farmland Conversion Impact Rating Ad-1006.)	
4	a. Will the proposed action have an impact on the human environment that may result from relocations of persons or businesses, changes in traffic patterns, changes in grade, or other types of changes?	C4a
	b. Has the proposed action received any preliminary or final approval from the local land use authority?	C4b
5	For the proposed action, is there documented controversy on environmental grounds? (For example, has the applicant received a letter of petition from an environmental organization?)	C5
6	Will the proposed action require work in, across or adjacent to a listed or proposed Wild or Scenic River?	
7	Will the proposed action require work in a Class I Air Shed or nonattainment area?	
8	Will the proposed action impact air quality or increase noise, even temporarily?	C8
9	a. Is the proposed project a MS4 Area?	
	b. Will the proposed action have potential to affect water quality, wetlands, streams or other water bodies? If YES, an environment-related permit or authorization may be required.	C9b
10	Are solid or hazardous wastes or petroleum products likely to be encountered? (For example, project occurs in or adjacent to Superfund sites, known spill areas, understorage tanks, or abandoned mines.)	
11	a. Are there any listed or candidate threatened or endangered species, or critical habitat in the vicinity of the proposed action?	C11a
	b. Will the proposed action adversely affect listed or candidate threatened or endangered species, or adversely modify critical habitat?	
12	Will the proposed action require an environmental-related permit or authorization? If the answer is "yes," please list the specific permits or authorizations.	C12
13	Is the proposed action within designated sage grouse habitat (https://sagegrouse.mt.gov/projects). (If yes, a consultation letter issued from the Montana Sage Grouse Habitat Conservation Program is required.)	
14	a. Is the proposed action on or within approximately 1 mile of an Indian Reservation?	
	b. If "Yes", will a Tribal Water Permit be required?	
15	Will the proposed action result in increased traffic volumes, increased wait or delays on state highways, or have adverse impacts on other forms of transportation (rail, transit or air movements)?	

		Yes	No	N/A
1		○	●	
2		○	●	
3		○	●	
4	a.	●	○	
	b.	●	○	
5		○	●	
6		○	●	
7		○	●	
8		●	○	
9	a.	○	●	
	b.	●	○	
10		○	●	
11	a.	○	●	
	b.	○	●	
12		●	○	
13		○	●	
14	a.	○	●	
	b.	○	○	●
15		○	●	

Montana Department of Transportation
Environmental Checklist

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16	Is the proposed action part of a project that may require other governmental permits, licenses or easements? If "Yes", describe the full extent of the project and any other permits, licenses or easements that may be necessary for the applicant to acquire.	(•) Yes ( ) No	C16
17	Attach a brief description of the work to be performed, including any subsurface work.	☒	Description Attached
18	Attach representative photos of the site(s) where the proposed action would be implemented. Photos are to include any structures, streams, irrigation canals, and/or potential wetlands in the project area.	☒	Photos Attached
19	Attach map(s) showing the location(s) of the proposed action(s); Section, Township, Range; highway or route number and approximate route post(s).	☒	Maps Attached

Checklist preparer:	Title:	Signature	Date
Jason Mullen	Fisheries Biologist	J Mullen	9/12/19

Reviewed for completeness by:

MDT District Representative	Title	Date

Checklist Approved by:

	Title	Date
Environmental Services Bureau (When any of the items 1 through 16 are checked "Yes")		
Transportation Planning (When any of the items 15 or 16 are checked "Yes")		

Checklist Conditions and Required Approvals

A. The applicant is not authorized to proceed with the proposed work until the checklist has been reviewed and approved, as necessary, and any requested conditions of approval have been incorporated.

B. Complete the checklist items 1 through 16, indicating "Yes" or "No" for each item. Include comments, explanations, information sources, and a description of the magnitude/importance of potential impacts in the right hand column. Attach additional and supporting information as needed. Ensure that information required for items 17, 18, and 19, is attached. The checklist preparer, by signing, certifies the accuracy of the information provided.

C. If "Yes" is indicated on any of the items, the Applicant must explain the impacts as applicable. Appropriate mitigation measures that will be taken to avoid, minimize, and/or mitigate adverse impacts must also be described. **Any proposed mitigation measures will become a condition of approval.** Use attachments if necessary. If the applicant checks "No" and the District concludes there may in fact be potential impacts, the Environmental Checklist must be forwarded to Transportation Planning for review and approval.

D. If "Yes" is indicated in item 11 a. (threatened or endangered species), the Applicant should provide information naming the particular species and the expected location, distribution and habitat use in the proposed action area, i.e. within the immediate area of the proposed action; or, in the general area on occasion (seasonally passes through) but does not nest, den or occupy the area for more than a few days.

E. If the applicant checks "Yes" for any item, the approach permit, occupancy agreement or permit, along with the checklist and supporting information, including the Applicant's mitigation proposal, documentation, evaluation and/or permits must be submitted to Transportation Planning. Electronic format is preferred.

F. When the applicant checks "Yes" to any item, the Applicant cannot be authorized to proceed with the proposed work until the MDT Environmental Services Bureau and/or Transportation Planning, as appropriate, reviews the information and signs the checklist.

G. Applicant must obtain all necessary permits or authorizations from other entities with jurisdiction prior to beginning the proposed action or activity. The Applicant is solely responsible for any environmental impacts incurred as a result of the project; obtaining any necessary environmental permits, notifications, and/or clearances; and ensuring compliance with environmental laws and regulations.

Montana Department of Transportation Environmental Checklist Supplemental Information

Summary of Project:

A December 2018 inter-agency meeting provided direction for Montana Department of Transportation (MDT) and Montana Fish, Wildlife and Parks (MFWP) to work together on projects to increase connectivity for fish and wildlife. This project will do exactly that by reconnecting Hardy Creek to the Missouri River, which will allow for rainbow trout to migrate up Hardy Creek to spawn, thereby improving the fishery on the Missouri River and benefitting the public. MDT has already verbally agreed to provide rock for the project from the rock storage site located on MDT property near Hardy Creek and for the general concept of the project to use fill from the south end of the gravel pit to construct a floodplain and stream channel on the north end of the gravel pit. This application is to allow MFWP to complete the work on MDT property and right of way. As described below, and in the attached Joint Application, the work being proposed on MDT property and right of way is necessary to provide passage for rainbow trout, which is currently restricted from both the on-channel gravel pit that was constructed for road material for construction of Interstate - 15 and from the culvert at Old Highway 91 (frontage road). Both Fish Xing simulations (attached) and visual observations of rainbow trout congregating below the Old Highway 91 culvert provide additional evidence that the culvert prevents fish passage, as previously suspected given that it is a perched, wide, shallow, long, and steep culvert. Addressing both of these areas (on-stream gravel pit and Old Highway 91 culvert) is necessary to ensure fish passage and connectivity for aquatic life in the stream.

MFWP will facilitate funding and payment for a consultant and contractor to design and implement a restoration project on Hardy Creek, including to restore and construct the Hardy Creek stream channel through an existing gravel pit, redefining the channel downstream of the gravel pit, and remove or modify several culverts in lower Hardy Creek.

The project will be completed as described in the Joint Application submitted to the Army Corps of Engineers and attached with the MDT right of way application. Included in the Joint Application is a detailed description of the measures needed to provide passage through the Old Highway 91 culvert. See Joint application and Figures CH-1, CH-2, and CH-5.

C1. A cultural survey was completed of the project area and submitted to SHPO as part of funding requirements from Northwestern Energy. All activities will be conducted in accordance with the approval from SHPO. There are no known historical or archaeological sites within the MDT right of way.

C2. Part of the proposed action (downstream of Old US Hwy 91) is being completed near the boundary of Montana State Parks property and MDT property. The project will improve the function of the Hardy Creek and is intended to improve the fishery. While this state park is focused on Tower Rock, improving the fishery of Hardy Creek may improve the recreational values and opportunities for the general area.

C4a. The proposed action will have a minor impact on the human environment as a result of short-term changes in traffic patterns at Tower Rock Road and Old Highway 91 during construction activities. Tower Rock road provides access to the Pistoria Tracts Subdivision and to the MDT rock stockpile area. It is expected that traffic disturbance will be short in duration, and only occur when equipment is accessing the construction site from Tower Rock Road or accessing Tower Rock Road from the rock pile site. These delays in traffic will likely only occur periodically and for very short period of time (a matter of couple minutes). Residents in the Pistoria Tracts Subdivision will have the opportunity to comment on this matter through the Environmental Assessment process.

Access to Hardy Creek downstream of Old US Hwy 91 is proposed from the north side of Hardy Creek. This will have no impact on the human environment, as vehicles and construction equipment will leave the highway and go through the road right of way to Hardy Creek, resulting in no impacts to travel on Old US Hwy 91. Equipment will be parked or staged off the highway to prevent any traffic disturbance.

C4b. The proposed action has received preliminary approval from the three private landowners (Stan Peck, Elaine Olsen, and Peter Grundy). The Pistoria Tracts Homeowner's Association president has expressed support for the project. Most of these areas are outside of the MDT right of way. Final landowner and homeowner's association agreements will be completed prior to commencing construction. These agreements can be provided, if needed.

C5. There has been no documented controversy on environmental grounds for this project to date. Local sporting groups have supported the project with funding, including Pat Barnes Trout Unlimited, Missouri River Flyfisher Chapter of Trout Unlimited, and Montana Trout Unlimited. An Environmental Assessment will be completed that will be open for public comment. The project will require review and permitting from several agencies.

C8. During implementation of the project, the project site will have the look of a construction site. Some large equipment will be used that create noise and emit fumes. These activities will be short-term and temporary. Surrounding landowners have expressed support for the project. The public will have the opportunity to comment through the Environmental Assessment process.

C9b. The proposed project is designed to improve the function of Hardy Creek, by improving the passage of fish, water, bedload, and debris through the culverts and by rebuilding a channel through the gravel pit. The channel will also be redefined downstream of the gravel pit to the Missouri River (outside of MDT right of way). Environmental review will be completed through the permitting process, which requires the following permits; a 404 permit from the US Army Corps of Engineers, a 124 permit from MT Fish, Wildlife and Parks, a 318 permit issued by MT Fish, Wildlife & Parks, through an interagency agreement with MT Department of Environmental Quality, Right of Way permit from MDT, and a floodplain permit from Cascade County Floodplain. All conditions imposed by these agencies in reviewing the project will be followed during the implementation of the project.

C11a. Federally listed threatened or endangered (T&E) species in Cascade County, include Pallid Sturgeon, Canada Lynx, Red Knot, Piping Plover, and Grizzly Bear. None of these T&E species would be expected in the project area of lower Hardy Creek, as they either reside downstream of Morony Dam

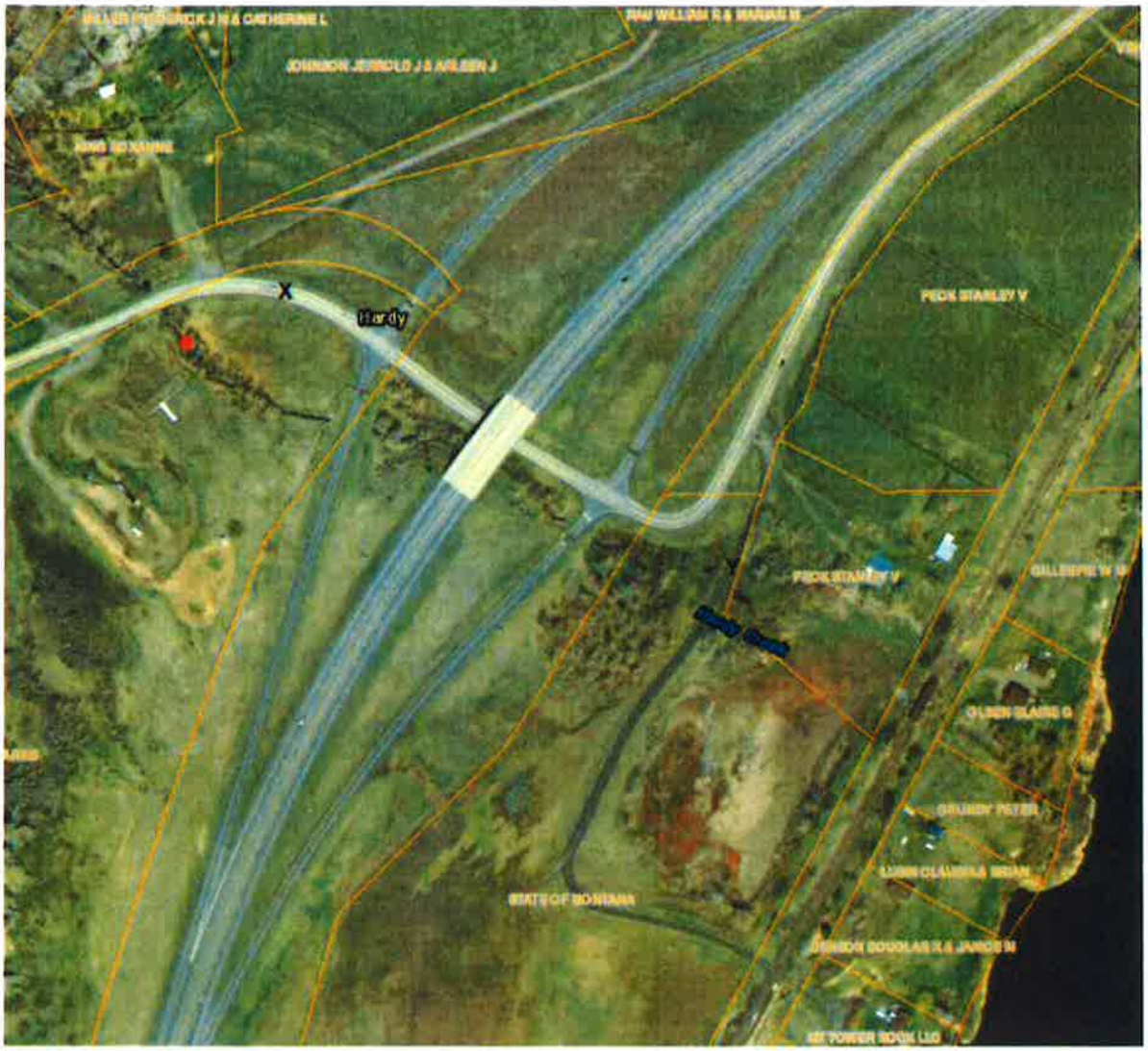
(e.g., Pallid Sturgeon), are more common in remote mountainous country, or are rare and migratory. While several grizzly bear sightings have been confirmed in the Cascade/Lewis and Clark/Meagher County area, it would be highly unlikely for an individual to be present in the project area during construction, due to their rarity, the presence of numerous roads, highways, and houses, and the general lack of cover.

C12. Environmental review will be completed through the permitting process, which requires the following permits; a 404 permit from the US Army Corps of Engineers, a 124 permit from MT Fish, Wildlife and Parks, a 318 permit issued by MT Fish, Wildlife & Parks, through an interagency agreement with MT Department of Environmental Quality, Right of Way permit from MDT, and a floodplain permit from Cascade County Floodplain. All conditions imposed by these agencies in reviewing the project will be followed during the implementation of the project.C16. Environmental review will be completed through the permitting process, which requires the following permits; a 404 permit from the US Army Corps of Engineers, a 124 permit from MT Fish, Wildlife and Parks, and a 318 permit issued by MT Fish, Wildlife & Parks, through an interagency agreement with MT Department of Environmental Quality. All conditions imposed by these agencies in reviewing the project will be followed during the implementation of the project.

In addition to these permits, we must also obtain permission from the BNSF Railroad (completed), the landowners, and the Pistoria Tracts Homeowner's Association. Landowners and the Pistoria Tracts Homeowner's Association have expressed support for the project. Documentation of these permits, BNSF Railroad permits, landowner permission, and Homeowner's association permission will be provided as part of this application.

Montana Fish, Wildlife and Parks will complete and Environmental Assessment that will provide an opportunity for public comment.

Maps and Access Locations



Map 1. General location of the Hardy Creek project area, near the Hardy Creek interstate exit. Gravel pit is dry in this aerial photo. MDT rock storage is located southwest of the gravel pit.

Map 2. The red dot depicts the location of drop structures to be constructed in Hardy Creek to allow fish to pass through the MDT culvert, located on Montana Fish, Wildlife and Parks property. The black X depicts the location where equipment will access the MDT road right-of-way from Old Hwy 91.

Map 3. The black Y depicts the location of the 6 ft culvert. The stream channel upstream of the culvert will be straightened to provide better passage of water, bedload, and debris through the culvert. Fill from the south end of the gravel pit will be used to construct a floodplain and stream channel on the north end of the gravel pit. The gravel pit will accessed from the northern shore from Stan Peck's property or from the south shore from the Tower Rock Road on MDT property.